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## ORIGINAL MEMOIRS.

### INTESTINAL OBSTRUCTION DUE TO VOLVULUS OR ADHESIONS OF THE SIGMOID COLON, WITH A REPORT OF FIVE CASES, AND A STUDY OF THE ETIOLOGICAL FACTORS.

ONE CASE OF RECURRENT VOLVULUS OF SIXTEEN YEARS' DURATION, THIRTY-  
TWO ATTACKS, CURED BY RESECTION; SECOND, AN OBSERVATION  
AT OPERATION, OF ACUTE VOLVULUS SEVEN HOURS  
AFTER THE ONSET OF SYMPTOMS.

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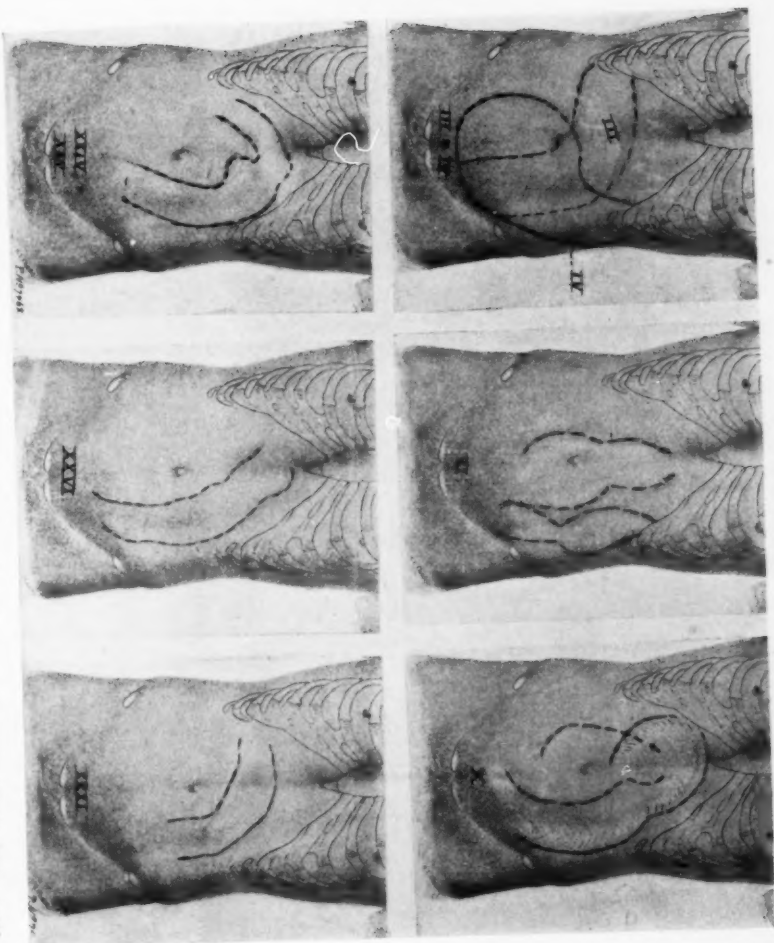
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THE object of this paper is not only to report two cases of volvulus which agree with the usual clinical picture and pathology of this rather rare form of intestinal obstruction, but to call attention to a distinct clinical picture of a more chronic nature which is associated with adhesions in the left side of the abdomen to the sigmoid colon or its mesentery. These adhesions may lead to acute volvulus or to recurrent attacks of abdominal pain or to definite attacks of partial obstruction. From this experience I am of the opinion that there may be a larger number of such cases which are treated for chronic constipation or under the diagnosis of an abdominal neurosis. The patients whom I have observed and whose histories are here reported have been relieved by operative intervention.

The first case (Case I; see Chart I and Figs. 1 to 8) has previously been reported before the Southern Surgical and Gynæcological Association ("Transactions," vol. xix, 1906, p. 503). This case is of great interest, because it is an example of recurrent attacks of intestinal obstruction due to volvulus of the sigmoid. We can be certain of the correct diagnosis, because at the first attack the abdomen was opened and the huge twisted sigmoid reduced. In the next sixteen years there were thirty-two attacks. After the last attack the abdomen was opened and the giant sigmoid resected. There were no adhesions, but the mesentery of the sigmoid colon was thickened and the foot points were approximated closer than normal (Figs. 1 and 2). This case is of additional interest as it allowed thirty-two observations on the clinical history and picture of this form of intestinal obstruction. Such an observation is of educational value, as rarely in any large surgical clinic in an equal period of sixteen years has such a number been observed. During this period in Professor Halsted's clinic of the Johns Hopkins Hospital, among 103 cases of intestinal obstruction, there has been but one other case of volvulus of the sigmoid colon. This case (Case I) is of further interest, as it demonstrates that acute volvulus of the sigmoid colon can be relieved by properly administered rectal enemata in the knee-chest position. It also brings out the fact that relief of a distinct volvulus of the sigmoid by this method or even by laparotomy and untwisting is but a palliative procedure, and that one should look for the cause of the volvulus, a band of adhesions, and, in some cases, should consider primary resection.

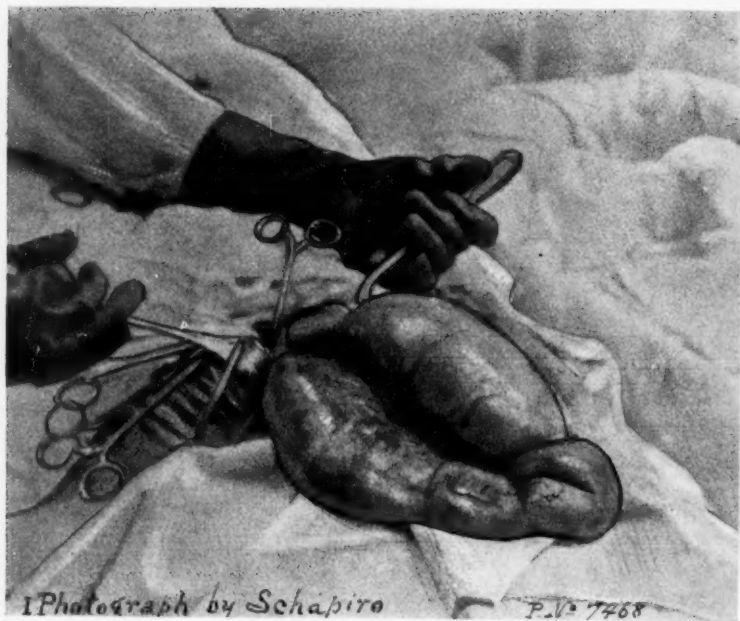
The second case gave me the opportunity to observe the first attack of an acute volvulus, to explore it seven hours after the onset of the first symptom and to find at the operation the band of adhesions which may have been the only etiological factor (Fig. 9). Primary resection was not done, the adhesions only were divided. One cannot look upon this patient as permanently relieved, because it is less than two years since the operation. In the first case reported here

CHART. I.



CASE I.—Diagrams of peristaltic movements of large bowel, made out at the third, fourth, sixth, tenth, twenty-fourth, twenty-sixth, and thirty-eighth attacks. Only in the fourth attack does the chart show peristaltic movements in the giant sigmoid. In other attacks this motion is confined to the transverse and descending colon only.

FIG. 1.



CASE I.—Photograph, at operation, of the giant sigmoid colon. No adhesions; the apex of the "U"-shaped bowel reached almost to the ensiform cartilage. This photograph illustrates the approximation of the foot points.



there was an interval of two years between the first and second attack.

In the third case the abdomen was opened five days after the onset of the acute symptoms and forty-eight hours after they had subsided. Nothing definite was found and nothing was done. The history, however, suggested a volvulus of the sigmoid colon, and this patient has been free from further attacks two years and four months.

In the fourth and fifth cases a diagnosis of chronic obstruction of the sigmoid colon due to adhesions was made, and these adhesions were found and relieved at operation.

Further observation may demonstrate that the number of such chronic cases which do not go on to a volvulus with its acute symptoms, are more numerous, and that patients with chronic constipation and recurrent attacks of abdominal pain simulating left-sided renal colic may be relieved of their more or less chronic invalidism by operative intervention, just as to-day we are relieving many patients whose abdominal symptoms are due to chronic appendicitis with which there are no definite acute attacks.

CASE I.—Pathol. No. 7468 (Chart 1, Figs. 1 to 8) ; W. M.; *recurrent volvulus of the sigmoid, thirty-two attacks in sixteen years, resection of giant sigmoid after the last attack, recovery, well two years and four months since operation.*

*Clinical History.*—This patient was first admitted to the surgical wards of the Johns Hopkins Hospital in January, 1890. The operation was performed in August, 1906, five days after the thirty-second and last attack.

I am able from this case to study the clinical history and physical examination of thirty-two attacks of definite intestinal obstruction, experienced by one patient. The first attack began when the patient was forty-seven years of age. He was admitted to the ward on the seventh day of the attack, and subjected by Dr. Halsted to immediate operation, at which the volvulus was untwisted. After this there was an interval without an attack of two years, when the patient sought treatment on the fifth day of the second attack. The obstruction was relieved by enemata. Seven days later the abdomen was explored by Dr. Finney, who

found a large colon and a large sigmoid still twisted, although the patient had no symptoms. The intervals between attacks in the next four years were twenty, twelve, and sixteen months, the patient seeking relief on the second, third, and seventh day respectively. Relief in each instance was easily accomplished with the rectal tube. From this time on—from 1898 to 1906, a period of nine years—the attacks were more frequent. The longest interval of freedom was nine months, the shortest twenty-four hours. In the years 1900, 1902, 1904, and 1905 there were four or five attacks in each year. It was for this reason that the patient desired relief by more radical means. It is of interest to note that in all, except the first attack, the patient was relieved at once by the passage of the rectal tube. The finding at the second operation,—that the sigmoid was still twisted after an apparent relief from the rectal tube,—may explain the subsequent attacks which occurred twenty-four hours to a few days after the patient left the hospital apparently relieved, and one attack that occurred in the hospital while the patient was in bed a few days after successful treatment with the rectal tube.

When I opened the abdomen five days after the thirty-second attack the sigmoid was untwisted, and there was no obstruction, but I could demonstrate clearly what little force was required to twist or untwist the horse-shoe-shaped giant sigmoid on its thickened mesocolon.

*The First Attack.*—The patient was then forty-seven years of age. Fifteen years before he had suffered from an attack of typhoid fever without complications. For a number of years he experienced attacks of indigestion at intervals of from four to six weeks. During these attacks his abdomen was distended with gas and he felt nauseated. Further details of these attacks are not given. Three months ago he fell and struck the abdomen, while he was doing some heavy lifting. The present attack is of one week's duration. He had been constipated, when suddenly he experienced general abdominal colic and a constant desire for stool. From the onset there had been no passage of fecal matter or gas. The patient observed a little mucus, but no blood. The abdomen gradually distended. In spite of these symptoms the patient continued to take food and to work. Vomiting began after three days, and has been present off and on ever since. This vomiting is associated chiefly with food or the cathartics which

he has taken. The initial acute pain of obstruction of the small intestine and the primary shock and vomiting were absent, but we have the symptoms of obstruction in the large intestine,—constipation, abdominal colic, secondary vomiting, distention. On admission the patient's condition was good,—the abdomen was uniformly and greatly distended. The operation was performed at once by Dr. Halsted. It is noted that the sigmoid colon was tremendously distended and protruded through the wound. The volvulus was complete; after untwisting, it is noted, the mesocolon was long. Now a rectal tube was introduced which evacuated large quantities of gas and fluid fæces. The wound was closed and the patient recovered without complications.

*The Second Attack.*—According to the history there was no suggestion of an attack for two years. The symptoms were identical with those of the first attack, except that vomiting began after forty-eight hours—two days earlier; and it is also noted that he had referred pain to the left lumbar region (similar to my more recent observations). He walked to the hospital. The examination showed uniform extension and tympany. With a rectal tube, high enemata and massage, gas and fecal matter were evacuated, and the physical signs subsided. Dr. Finney opened the abdomen seven days later: small intestines adherent to scar of previous median-line incision and a loop of small intestine which was caught, but not obstructed by a band, was first encountered; this band was divided; transverse and ascending colon were larger than normal, and there was a double twist in the sigmoid; this was untwisted, rectal tube passed, which brought away gas and fluid fecal matter.

I wish to emphasize the finding at this, the second, operation. The patient was apparently relieved, yet the sigmoid was still partly twisted.

*Recurrent Attacks.*—I have carefully read the clinical notes on the subsequent thirty admissions and made charts of the symptom of onset, the subsequent symptoms and the findings at examination (Chart 1). With very little variation each attack is a counterpart of all the others. Colic is the first warning. Now and then this has been preceded one or two days by constipation. On this special fact the history is often silent, but records seem sufficiently clear to demonstrate that during all these years if the patient went forty-eight hours without stool an attack

was sure to follow. In the majority of the attacks one day's constipation was followed the next day by colic and the beginning of an attack. In a few attacks the colic was observed within twelve hours after an apparent normal evacuation. Once the colic appeared the symptoms of obstruction continued until the patient sought relief in the surgical wards by the rectal tube. On a few occasions, a new attack followed relief from an old attack at the hospital with the rectal tube within twenty-four hours.

During the first seven years there were only five attacks, with intervals of from one to two years. In the next seven years there were twenty attacks with the longest interval of nine months. Among these twenty attacks nine were after very short intervals—twenty-four hours to ten days. In the following two years, although there were but six attacks, four of them were after brief intervals of freedom. The attacks, then, were becoming more frequent. As I look upon a short-interval attack as an evidence of incomplete reduction of the volvulus through the employment of the rectal tube and enemata, there is evidence, therefore, of an increasing number of incomplete reductions of the twist.

The duration of the attack from the time of the first symptom to relief varied from twelve hours to seven days. As a rule the patient was sufficiently uncomfortable to seek advice at the end of the third day. During the last three years he came to the surgical wards usually after twenty-four hours, and never waited longer than two days. The patient did this not because he was more uncomfortable, but apparently influenced by our advice and the confidence of getting immediate relief.

The patient never succeeded in relieving himself, although he frequently attempted this with rectal enemata.

The attack, preceded by an interval of constipation, began with general abdominal colic, now and then with pain referred to the lumbar region and back; then with distention of the abdomen, and if he delayed, vomiting. The latter was never a prominent symptom, except in those attacks in which the patient waited three to seven days. At the examination, except on the first two occasions, when the attack had been present five and seven days respectively, the distention was asymmetrical and confined chiefly to the left side of the abdomen, and peristalsis of the transverse and

descending colon could be made out (Chart 1). On not a single occasion was there any evidence of peristalsis of the small intestines. The percussion note was usually tympanitic. When the rectal tube was passed gas was evacuated first, then fluid fæces. The evidence seems to point to the fact that gas was the chief factor in producing the volvulus.

In a few attacks there was slight variation in the symptoms. For example, in one, of forty-eight hours' duration, and in another, of three days' duration, vomiting and colic began together. In the other attacks there was a distinct interval between the onset of the colic and vomiting. With few exceptions vomiting was not present unless the attack was of forty-eight hours' duration or longer. In a few, vomiting was absent even when the colic, constipation and distention had been present from two to three days.

The first vomiting, with few exceptions, began after the patient had taken cathartics himself. When he took no food or cathartics vomiting was practically absent. It was never fecal.

Constipation was absolute in every attack, and in only one it is noted that the patient passed some flatus. Distention with the rarest exceptions began within a few hours after the colic. In one or two attacks there were intervals of one to two days before the patient observed the distention. This is noted only in the early attacks before the patient had developed an acuteness of self-observation. There are two leucocyte counts: one of 18,000 in an attack of three days, and one of 9,000 in an attack of five days. There was never fever, nor retention of urine. The patient's general condition was always good.

*The Symptoms of Volvulus.*—From this study we may describe the clinical picture of volvulus as follows:

The patient will give a history of constipation,—the attack begins with colic, as a rule in the umbilical area and the left abdomen, radiating from epigastrium to iliac fossa, with pain sometimes referred to the left lumbar fossa and the back. Pain is never severe like the initial pain in obstruction of the small intestine, or strangulation. The intervals between the pains grow shorter and with this their intensity increases. The character of the pain suggest its relation to peristalsis of the colon, and this is confirmed at the examination, because when one sees the wave of peristalsis the patient complains of pain.

The initial shock of small-intestinal obstruction or strangulation is absent. Initial vomiting is very rare. Following the colic the patient observes distention, chiefly on the left side, and most marked in the lower left quadrant; constipation continues; it is absolute; rarely is flatus passed; vomiting is a late symptom, and usually induced by cathartics or food; belching and hiccough now and then are observed, the latter is infrequent; leucocytosis may be found. At the examination, the distention is asymmetrical and broad peristaltic waves are present in the epigastrium and the left side of the abdomen. The percussion note is tympanitic. The patient's general condition is good, even in attacks of from three to seven days' duration.

*The Mechanism of Volvulus.*—In this case there is evidence to indicate that dilatation of the sigmoid colon was present before the first attack. The cause of this cannot be ascertained. We have therefore to explain the mechanism of the recurrent attacks. There is every reason to believe that the sigmoid remained dilated (as shown in Fig. 2 and found at the operation). This dilated colon acted as a reservoir for fæces. I am impressed with the view that fermentation with the formation of gas in the dilated sigmoid colon is the first etiological factor, and careful observation would demonstrate that distention was the first symptom. This loop distended with gas is lifted up into the abdomen, just as the pregnant uterus is forced out of the pelvis by the growth of the fœtus. As the sigmoid rises a kink is produced at its junction with the descending colon, because this portion of the colon is fixed. I demonstrated this at operation. This of itself would be sufficient to produce obstruction and excite peristaltic action of the colon, giving rise to the first symptom observed by the patient,—colic. At this time there is no evidence of a kink in the rectum, but the sigmoid does not evacuate its contents because its walls are overdistended. The exact mechanism of the twist is difficult to establish, but as the dilated sigmoid rises and its upper arm becomes more and more tense on account of its attachment to the fixed descending colon, the lower portion of the sigmoid and the upper rectum, which are less fixed, rise, and as the least resistance is up and to the left, the distended lower portion of the sigmoid and the rectum move in that direction, and the upper portion of the sigmoid is twisted downwards and to the right, while the lower portion moves upwards and to



FIG. 2.



CASE I.—This drawing is made from the photograph (Fig. 1) and the Kaiserling specimen. It illustrates the inflammatory changes in the mesentery, the approximation of the foot points of the sigmoid, and the thickening of the peritoneal coat of the sigmoid colon and rectum. In the lower half of the sigmoid, which is most distended, the longitudinal bands become indistinct.



FIG. 3.



CASE I.—Photograph, at operation, with the clamps on the divided mesenteric vessels and sigmoid. This was performed before the gut was divided.

FIG. 4.



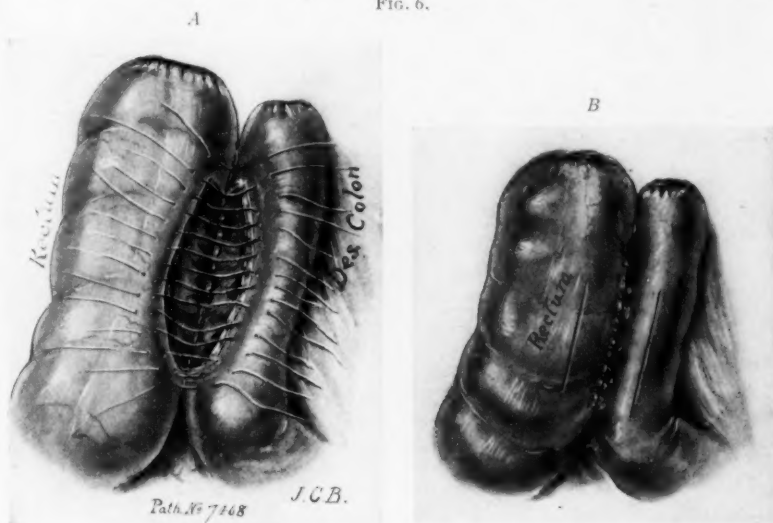
CASE I.—Photograph, at operation, after the removal of the giant sigmoid colon. The closed ends of the rectum and colon are shown projecting from the wound without tension, in a convenient position for lateral anastomosis.

FIG. 5.



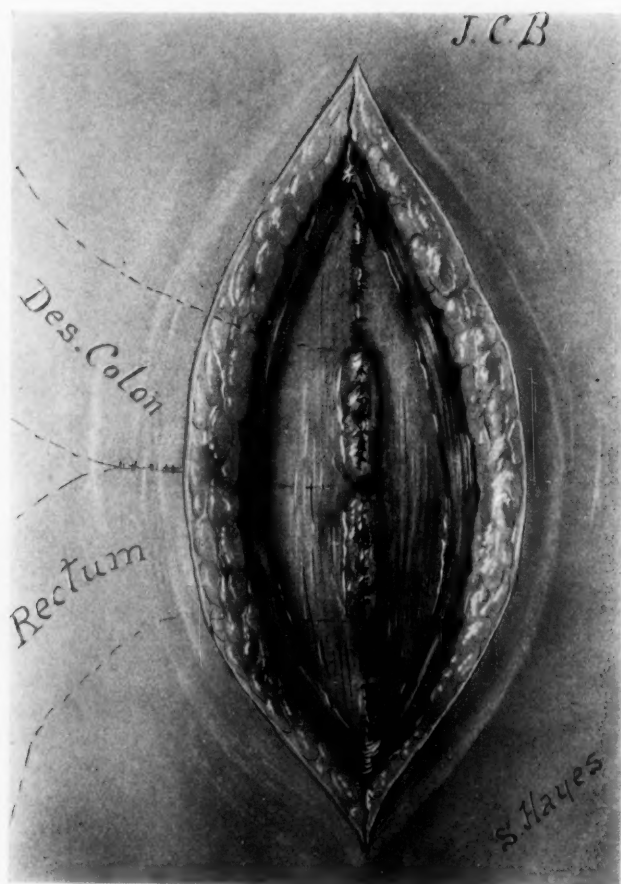
CASE I.—This sketch demonstrates the relation of the inverted stumps of the rectum and descending colon to the mesentery after the removal of the giant sigmoid. In view of the close approximation of the foot points of the sigmoid there was very little folding of the mesentery, and in the mesentery left behind very little evidence of inflammatory changes.

FIG. 6.



CASE I.—Sketch of the method of lateral anastomosis between the smaller descending colon and larger rectum.

FIG. 7.



CASE I.—Sketch of the method of including the closed inverted ends of the descending colon and rectum (Fig. 6 B) in the suture of the parietal peritoneum of the wound.

the left, and the twist is from right to left. This mechanism is also aided by the attachment of the mesentery to the left. The twist kinks the rectum, and we have a double obstruction.

From the notes of the first two operations it can be established with considerable probability that this was the position of the twisted giant sigmoid colon, and at the third operation I was able to twist the sigmoid only in this direction.

*The Mechanism of Relief.*—The rectal tube has to be forced past the kink in the rectum into the dilated sigmoid. If this is accomplished the gas immediately escapes followed by fluid faeces. On a number of occasions this could be accomplished only with the aid of water distending the rectum in front of the tube. It was found that when the patient was placed in the knee-chest position the rectal tube could be inserted with less difficulty. On a few occasions there was no difficulty whatever in passing the rectal tube, in any position of the patient, while on others it required repeated efforts in the knee-chest position. It seems easy to explain this by a variability in the extent of the twist. When there was little or no difficulty in inserting the rectal tube, the probabilities are that the twist was slight or not present at all, and in the most difficult cases the volvulus was complete.

*Findings at the Third Operation.*—As the attacks were becoming more frequent the patient quickly consented to an operation which promised permanent relief without too large an element of risk.

On August 2, 1906, under ether narcosis I opened the abdominal cavity through the left rectus muscle. The sigmoid and ascending colon occupied the entire lower left quadrant of the abdomen. There were some adhesions of the small intestines to the abdominal wall in the region of the first laparotomy wound. As these were to the medial side of the present incision they were not disturbed. The patient was placed in the Trendelenburg position. Now, without any difficulty, the giant sigmoid colon was lifted out of the wound and placed upon the sterile towels covering the upper abdomen, as shown in Figs. 1 and 2. The distention of the colon began 10 cm. from the splenic flexure, at the beginning of the sigmoid colon, involved the entire sigmoid and as much of the rectum as could be followed into the pelvis. The rectum below the promontory of the sacrum was covered with a thickened fold of peritoneum extending from the bladder.

All of the peritoneum over the pelvic floor felt thicker and had a more opaque whitish color than the normal peritoneum elsewhere. The mesocolon of the sigmoid was not unusually long and, in fact, rather short as compared with the size of the colon. The appearance of the peritoneum covering this mesocolon was entirely different from the normal peritoneum. It was a thick, opaque, white membrane, and one could not make out the vessels between the folds. The peritoneal covering of the rectum and lower half of the sigmoid colon presented the same thickened, opaque, white appearance. On the sigmoid colon the peritoneum of its upper third was normal in appearance, although the bowel was distended. The distention of the gut increased in diameter from the junction of the descending and sigmoid colon and reached its maximum in the upper portion of the rectum just below the promontory of the sacrum. Below this the distention was less, but the bowel was larger in diameter than the descending colon (Fig. 2). The thickened condition of the peritoneum, both on mesentery and bowel, increased with the distention of the bowel. There were, however, no adhesions.

It was decided to resect, close the two ends by inversion and suture, and then perform lateral anastomosis. The point of resection was chosen in both instances through the bowel at the level of the abdominal wound as the giant sigmoid lay on the upper abdomen, having been placed there with gentle traction only (Figs. 2 and 3). First the peritoneum of the mesosigmoid colon was divided (Fig. 3) at the base between the foot points of the "U," turned back like a cuff, and each vessel separately ligated. Now, when the mesentery was divided there was no hemorrhage, and it could be protected with gauze, while the gut was divided. The division was made between the usual clamps with strong, straight scissors and disinfected with pure carbolic acid. The Paquelin cautery would have been simpler and more efficacious, but unfortunately it was not available at that time. The divided ends of the intestine were inverted with catgut in the usual way. The peritoneum was then again approximated with interrupted fine black silk. The ligated stumps of the mesenteric vessels were covered with a peritoneal suture. The two blind ends of the intestine lay side by side in the lower portion of the abdominal wound (Figs. 4 and 5). A lateral anastomosis was made (Fig. 6, *a* and *b*) beginning 1.5 cm. from the inverted end; their mesen-

FIG. 8.



CASE I.—Photograph of patient,  
December, 1908, two years and four  
months after operation.

FIG. 9.



CASE II.—Sketch illustrating the findings at operation.  
*B*, band of adhesions between the upper third of the sigmoid and the parietal peritoneum of the iliac fossa.



teric surfaces came together to the medial side; a large opening was made. In closing the wound the inverted ends of this anastomosis were placed outside of, and included by, the peritoneal suture (Fig. 7). This anchoring was done for two purposes: first, because there is always danger of sloughing when intestines are inverted in this way, especially when the bowel has been distended and its walls thickened, while when sutured in this manner any leak would take place extraperitoneally; second I was of the opinion that the anastomosis would work better if the bowel was fixed to the abdominal wall. The wound was closed with a small piece of packing extending to the ends of the intestine.

Following the operation, there were no complications and the wound healed without any evidence of leakage from the closed ends of the intestine.

At this time, December, 1908 (two years and four months since the operation), the patient has had no further attacks of intestinal obstruction. He also informs me that his general health is better. There is no evidence of weakness in the scar, and the stools are normal in every respect (Fig. 8).

My second observation is of interest, because it allowed me to see a volvulus in its acute stage and, perhaps, the etiological factor.

CASE II.—Pathol. No. 7999; Mr. F. R. S.—*Diagnosis: acute intestinal obstruction two weeks after appendectomy. Operation seven hours after the onset of the symptoms. Laparotomy: reduction of volvulus of sigmoid, division of a band (Fig. 9) between the sigmoid colon and the peritoneum of the left iliac fossa. Recovery.*

*Clinical History.*—White male, aged 33. On February 19, 1907, at the St. Agnes Hospital, I removed the appendix through a McBurney-Weir incision and closed the wound without drainage.

*Pathologic Findings at This Operation.*—On opening the peritoneal cavity an unusually large cæcum and ascending colon were exposed; the mesentery of the cæcum was longer than normal and, covering the peritoneal surface of both extending to the mesentery, and in places to the parietal peritoneum at the base of the mesentery, there were numerous vascular bands of adhesions.

The appendix, 8 cm. long and free, was situated to the lower and median side of the cæcum. The appendix was covered with a fine net-work of new blood-vessels which extended to the cæcum. There was one band of adhesions producing an S-like constriction in the middle third of the appendix. These findings I have observed before in cases of enteroptosis of the colon. The adhesion producing a constriction of the appendix without doubt interfered with the emptying of this organ. The removed appendix showed an unusually large lumen and a wall thicker than normal. The right kidney was of normal size and in place.

*Clinical History.*—The patient was referred to me with symptoms of renal colic. The first attack had taken place one year before. The attacks consisted of pain in the lumbar region and the right groin. These attacks were observed only when the patient was standing. The pain was of a dull character and was not associated with nausea or vomiting. The attacks have never been severe enough to confine the patient to bed. After the attacks the urine was cloudy, but there was no blood. The X-ray examination was negative as to renal calculi in kidney and ureter. On examination the kidneys could not be palpated, but on two occasions I felt in the right iliac fossa a movable finger-like mass. The urine contained a trace of albumin, oxalate crystals, and a few red blood-cells.

*Postoperative Notes.*—The acute attack began two weeks after the appendectomy and after the patient had been out of bed about three days. He had been constipated twenty-four hours, but went to bed feeling first rate. At about three o'clock in the morning the patient was awakened out of a sound sleep with pain referred to the left loin posteriorly. The description of the pain answered somewhat to that of a renal colic. The pain in the first few hours was so intense that there were slight symptoms of shock (the so-called peritoneal shock,—an early sign of strangulation. There was the initial vomiting of acute obstruction. When the resident, Dr. Shaw, examined him one hour after the onset of the pain, the patient was rolling in bed from side to side, flexing the thighs on the abdomen. The face was pale, the pulse, recorded at 8 P.M., at that time about 80, was now 120, the temperature (by mouth) subnormal. Morphia, gr.  $\frac{1}{8}$ , was given at once and repeated in three-quarters of an hour. This simply relieved the acuteness of the pain. Two enemata were ineffec-

tual. When the stomach was washed out nothing was removed but a little bile-stained fluid.

I saw the patient six hours after the first symptom. The pain now was of a dull character. The symptoms of peritoneal shock had disappeared. The pulse was 90, the temperature 99. The total leucocytosis was 36,000, on a second count 40,000. The urine contained red blood-cells, a trace of albumin and some casts. This finding, which had been present before the first operation, had disappeared a few days later. When the foot of the bed was lowered for my examination (the patient had been placed in this position on account of shock) he complained of nausea and vomited; the pulse increased to 130. There was no recurrence of the vomiting and the pulse dropped to 90. The area of pain was in the left loin to the outer side of a vertical line through the anterior iliac spine. This area, in my experience, was situated lower and more to the median side than the pain in renal colic. On palpation, the patient stated that there was no tenderness, but the left rectus and the left abdominal muscles were rigid, preventing deep palpation. I could make out no mass. On percussion, there was very slight obliteration of the liver dullness, although the abdomen was not distended, and in the left lumbar region there was a distinct zone of flatness not present on the right side. On further palpation, as the muscles relaxed, I was of the opinion that I could feel a tense, smooth tumor in the iliac fossa (Von Wahl's sign). The symptoms,—shock, initial vomiting, Von Wahl's sign, the inability to get fæces or gas with enemata—were, in my opinion, evidence against renal colic and in favor of obstruction. In addition, we had a previous X-ray as further evidence against stone. The attack of pain on this left side differed from those on the right in intensity. It seemed to me quite possible that the adhesions observed on the right side might also be present on the left side in the mesentery of the sigmoid colon.

For these reasons I considered the diagnosis of volvulus as most probable and advised immediate operation rather than delay for attempts with further enemata. On opening the peritoneum through the left rectus muscle there was no fluid, and normal, non-distended small intestines were exposed. Pushing these intestines upwards and to the median side I could see a very greatly distended sigmoid colon. It was not twisted. The veins

in the mesentery of this colon were tremendously engorged—an appearance in distinct contrast to the vessels in the mesentery of the small intestine, descending and transverse colon. This engorgement of the veins impressed me as the result of a twist in the sigmoid which had relieved itself, or which I had relieved in the manipulation necessary to expose it. The splenic and descending colon were distended. As I pulled the sigmoid colon out of the abdominal wound I observed an acute flexion in the upper third. From the mesentery at the apex of this flexion a definite band of adhesions passed down along the mesosigmoid to the peritoneum of the left iliac fossa (see Fig. 9). The foot points of the "U" of the sigmoid were close together. The entire sigmoid was distended, and this distention extended into the rectum as far as it could be inspected. Now a rectal tube was passed, and a large quantity of gas and fecal matter withdrawn. I was able to increase this quantity by compression of the colon and rectum, and then hard fecal masses which were not evacuated by the tube could be felt.

As a rectal tube had been passed a few hours before operation with a negative result, it seems justifiable to conclude that the obstruction was relieved during the operation, because the rectum below the sigmoid was distended with gas and liquid fecal matter.

A complete resection of the sigmoid colon with lateral anastomosis of its foot points would not have been a difficult operation, but I decided to confine my intervention to division of the band only. After this band was divided the raw surface was covered with peritoneal suture.

Twelve hours after operation there was a large liquid stool containing solid fecal masses.

The convalescence from this operation was uneventful. One month after operation the patient had a slight attack of pain in the right hypochondrium. Three months later a second attack with nausea and vomiting. This attack was associated with constipation. At the present writing, December, 1908, one year and eight months since the second operation, there have been no further attacks.

CASE III.—Pathol. No. 7942. *Clinical Diagnosis: Question between volvulus and carcinoma of the sigmoid. Patient observed five days after the onset of the acute attack of intestinal obstruction. Exploratory laparotomy; negative findings.*

*Clinical History.*—E. R. L., white, male, aged 40, was admitted to the Johns Hopkins Hospital on August 22, 1906, and the following history was obtained from Dr. Carr, his physician, and the patient. In the previous history there is nothing suggestive except that four and two years ago there were distinct attacks of dysentery in which the stools contained blood and mucus. In the interval between these attacks there were no symptoms, but the last year the patient has observed an increasing constipation with intermittent ribbon stools, but no loss of weight and no evidence of weakness or anæmia.

The acute attack began five days before his admission to the hospital. The symptom of onset was pain beginning in the left lumbar area and extending from here into the left iliac fossa, the groin, and the left testicle. The pain began about ten in the evening, some hours after the last meal. Previous to the onset of the pain there had been no unusual constipation that the patient could remember. The pain began acutely, the patient feeling in perfect health before. The first attack of pain lasted four hours, and there was vomiting. Between Thursday and Sunday evening—a period of three days—there were four such attacks of pain. Except in the first attack the pain was not referred to the testicle. With each attack there was vomiting. As far as I could make out there was no marked shock. During this time he was given castor oil and numerous enemata without effect. When seen Sunday evening by Dr. Carr there was an indistinct tender mass in the left iliac fossa. After this examination there was a large stool following the administration of a high enema. Since this time there have been no further symptoms, and the mass and tenderness have practically disappeared. He entered the hospital Tuesday morning, about 36 hours after the end of the symptoms. The patient was not in discomfort, there was no abdominal distention, but on deep palpation in the iliac fossa one gets the impression of feeling a distended piece of bowel. The urine was negative, the leucocyte count 7,000. When I first saw the patient, although he was feeling comfortable, the bowels had moved and he did not feel nauseated, there was a distinct fecal odor to the breath, and one suggesting acetone, and during my examination the patient expectorated a thin brownish fluid which had a distinct fecal odor. For this reason I am inclined to the opinion that there had been fecal vomiting. This odor disappeared within 24 hours.

At this date, in 1906, over two years ago I was quite familiar with the clinical picture of volvulus from a study of the case reported first in this paper, because this patient (Case III) entered the hospital about three weeks after I had operated upon the patient in Case I. From this clinical history, however, one could not exclude a malignant tumor of the large bowel.

In a study of a number of such cases I have been struck with the observation that in the previous history, acute attacks of intestinal obstruction, lasting from one to five days with recovery after enemata have been present in at least one-fourth of the cases. *It is so unusual for a patient with acute intestinal obstruction to recover without operation, that such a history can be looked upon as evidence of a malignant tumor, but this more recent study of the rarer lesion—volvulus of the sigmoid colon—demonstrates that the same may occur here.*

At the operation in this third case on August 28, 1906, six days after the patient had been in the hospital without symptoms, I could find nothing abnormal. I could positively exclude a new growth. Whether there had been a volvulus I am not prepared to say. I carefully examined the mesentery of the sigmoid colon and could not find the adhesions observed in Case II and in Cases IV and V to be considered next. Whether at that time I overlooked some anatomical changes which I might recognize to-day from a larger experience, I am not prepared to say, but the gross lesions found in the other cases were not present. I am inclined, however, to the opinion that this patient had suffered from a volvulus of the sigmoid colon, and perhaps during the two attacks of dysentery inflammatory changes in the mesocolon had led to certain changes which were the etiological factor of the volvulus. This was distinctly so in the fourth case about to be reported.

At the present writing, December, 1908, two years and three months since the operation, this patient writes me that he is in perfect health and has had no further attacks.

CASE IV.—Pathol. No. 9149. *Clinical Diagnosis: Chronic obstruction of the sigmoid colon. Operation: Freeing of adhesions between the parietal peritoneum of the iliac muscle and the mesocolon (Fig. 10). Recovery.*

This patient, a white male, aged 30, was brought to me by Dr. Gregg, of Florence, S.C., with a clinical history very suggestive of a stone in the left kidney. However, in going over the



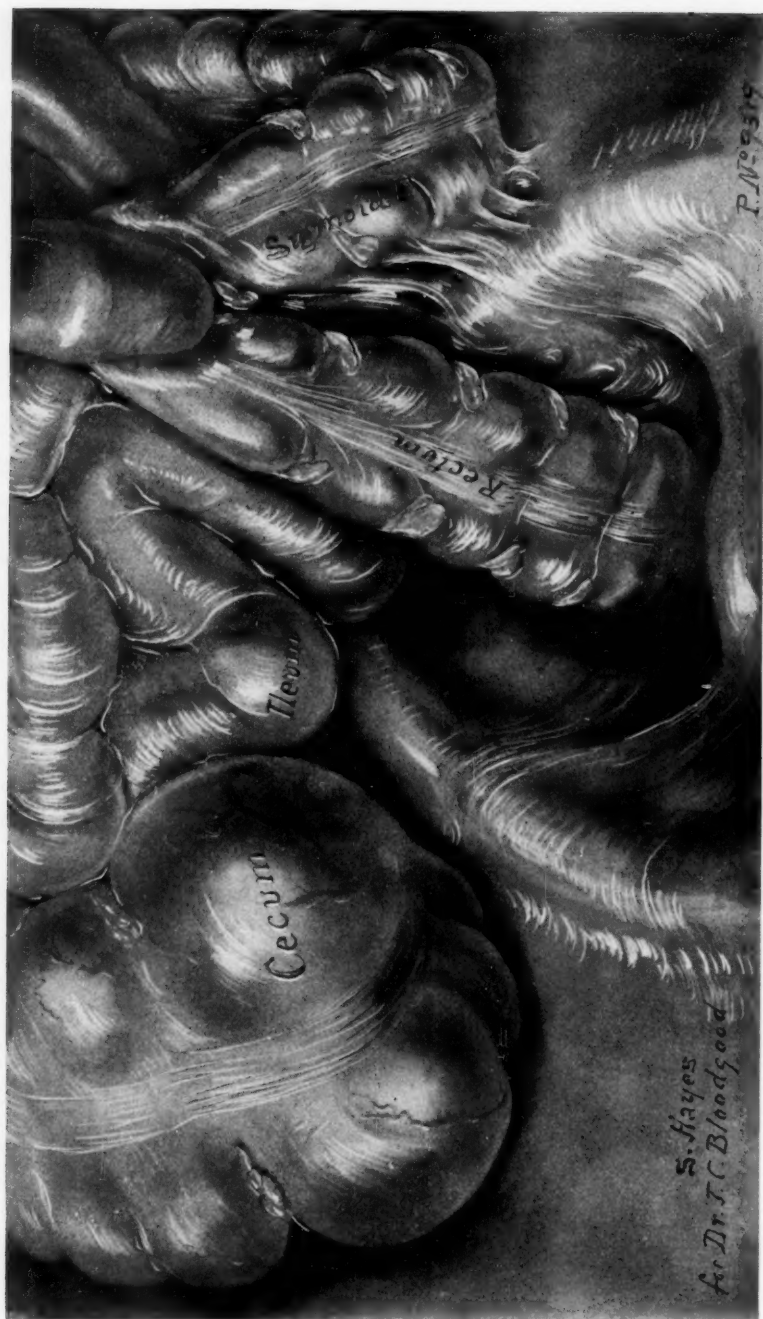
FIG. 10.



CASE IV.—Sketch of the findings at operation showing the dense adhesions between the junction of the sigmoid and descending colon and the parietal peritoneum of the iliac fossa. The appendix is retracted into a "U"-shaped organ by a shortened mesentery.



FIG. 11.



CASE V.—Sketch of findings at operation, showing the adhesions between the sigmoid colon and the parietal peritoneum at the brim of the pelvis and the broad ligament.

facts in the history I came to the conclusion that I was dealing with a chronic obstruction in the sigmoid colon. It was my experience with the cases just reported that led me to this belief. The X-ray showed no stone in kidney or ureter.

We have in this case a history of dysentery ten years ago, lasting some months. The first attack of abdominal pain began four years after the dysentery. In these six years there was an interval of five years between the first and second attack of pain, and in the last four months there have been five attacks. The pain is referred to the same area described in Cases I and II. It is always preceded by constipation and associated with nausea and vomiting. The intense pain lasts from two to six hours. The relief is immediate when the enema is successful; sometimes more than one enema is required. In none of these attacks has the pain been referred to the testicle. Three months ago he had a slight attack of pain in the right iliac fossa.

The operation was performed at St. Agnes Hospital in August, 1908. The sigmoid was explored through an incision at the outer border of the left rectus muscle with the patient in the Trendelenburg position. The findings were practically identical with those in Case II. The band of adhesions on the whole was broader and shorter (see Fig. 10). Influenced by the involvement of the appendix in Case II, I explored the appendix in this case through a McBurney incision, and removed it. The appendix was free and apparently normal, but hitched up by a shortened mesentery (Fig. 10).

It is four months since the operation, and the patient has had no recurrence, although in the three months preceding the operation there had been three attacks.

CASE V.—Pathol. No. 9319. (*Recent case*). *Clinical Diagnosis: Chronic obstruction of the sigmoid colon of many years' duration. Operation: Freeing of adhesions (Fig. 11). Recovery.*

*Clinical History.*—White female, aged 38, married, no children. It was very difficult to get a clear clinical history. When I first saw the patient two years before the operation she had every symptom of a grave melancholia. However, from the history at that time, I was of the opinion that there was some mechanical obstruction in the sigmoid colon, and operation was advised. I did not see the patient again until October, 1908. During these two years, in spite of absolute rest and the most careful dietetic treatment, the symptoms had increased.

The patient had become a chronic invalid. She was in such a nervous state that she would not allow an examination of the abdomen. The slightest touch of the abdomen, the patient claimed, made her so nervous that she could not control herself, and it produced nausea.

Evidently some fifteen years ago, shortly after marriage, there had been a pelvic peritonitis, perhaps of gonorrhœal origin. Gradually after this illness she observed increasing constipation, and during the last six years, in order to move the bowels, it has been necessary to take larger doses of cathartics. The patient has administered to herself a proprietary "liver pill," and the doses gradually increased from two to sixteen and twenty a day. Formed stools have not been observed for five years, and during the last two years it was necessary that they should be liquid before an evacuation could be had. The patient states that during all this time she experienced pain in the left lower abdominal quadrant. The pain is worse when twenty-four hours intervene without a stool. If she allows the constipation to go longer she observes distention in the left side of the abdomen, increase of the pain, and now and then vomiting. For three years she has been unable to continue her profession as a dentist and has sought relief in rest and diet. Except for this definite history of constipation and localized pain and the absence of normal formed stools, the patient exhibits the exaggerated picture of a neurosis.

I felt, however, from my experience in the other cases that there was a mechanical non-malignant obstruction. Its long duration excluded a malignant tumor; the old pelvic peritonitis suggested the etiological factor.

The operation was performed at the St. Agnes Hospital November 7, 1908. The sigmoid was plastered by dense fibrous adhesions to the parietal peritoneum over the iliac muscle at the brim of the pelvis to the broad ligament, tube and ovary on the left side. The sigmoid could not be lifted from this bed. It was less movable than the lower half of the duodenum, and in this position there were two or three kinks (Fig. 11). The adhesions could be divided with the knife in such a way that the visceral peritoneum of the sigmoid was not injured. After accomplishing this I could lift the sigmoid and demonstrate that its mesentery, although somewhat involved in the adhesions, was still intact. That is, the mesentery had not yet been converted into scar tissue.

Both tubes and the left ovary were removed. There were adhesions between the uterus and the rectum which could be divided with the knife and scissors. The division of all these adhesions caused practically no bleeding. The raw surfaces could be covered with peritoneal suture.

This patient, after operation, suffered for five days with distention of the abdomen. That is, the postoperative paresis of the intestines was much more marked than usual. After this had subsided and the patient began to take ordinary diet, normal formed stools were observed for the first time in years, and I was able to gradually reduce the cathartic pills to two a day.

This patient is still in the hospital, one month after operation, because of a phlebitis of the right leg on the fifteenth day and a left-sided pleurisy on the twenty-third day. These complications, we know, are more frequent after pelvic operations.

*Remarks.*—Volvulus of the sigmoid colon is one of the rarer forms of intestinal obstruction. Among 103 cases of intestinal obstruction observed in Dr. Halsted's clinic of the Johns Hopkins Hospital there have been but two examples observed. The first case is reported here; the second observation is an example of a recovery, although the operation of untwisting was not performed until the sixth day after the onset, and it is interesting to note that in this case there was a recurrent attack within a year after the patient left the hospital which terminated fatally without operative intervention.

*Literature.*—I have examined the literature since 1902, and it seems to be the opinion of the majority that the volvulus recurs if at the operation for relief the surgeon contents himself with only untwisting. No one, however, has advocated resection as a primary operation in all cases. If gangrene is present resection, of course, is indicated.

Kiwull, a Russian surgeon, in 1902 (*Mittheilungen a. d. Grenzgebieten d. Med. u. Chir.*, 1902, vol. x, p. 105) gives a very good discussion of the diagnosis. He recognizes two types,—first, the acute volvulus in which the clinical history and symptoms are practically identical with my Case II, the

initial vomiting and shock of which, so common in the so-called group of strangulated ileus, are here present; second, the subacute type, in which these symptoms are absent and the vomiting does not come on until later. In all cases there is usually a previous history of constipation, in some the acute attack follows a large meal, in others a trauma. In all of the cases absolute constipation of fæces and gas is observed, and if the examination is made early there is an asymmetrical distention on the left side of the abdomen. In a few cases the palpation of the distended loop (Von Wahl's sign) has been made out. This sign is more readily obtained if the abdominal muscles are relaxed by placing the patient in a warm bath. Peristalsis, if present, is observed chiefly in the transverse and descending colon: rarely in the distended sigmoid loop (Chart 1). Pain referred to the lumbar region,—a constant symptom in my cases,—is not mentioned prominently in the literature.

Kiwull reports eight cases observed in his clinic. This number is not only unusually large, but the results of operation were unusually good. There was but one death from pneumonia in a patient aged seventy-one. All of the patients were over forty years of age, and but one was a female. In the majority of his cases the operation was performed within forty-eight hours. It consisted in untwisting of the volvulus. In this report there are no observations of the condition of the mesentery. Gangrene was not observed, but in one case the circulation of the sigmoid looked impaired and for this reason the replaced intestine was isolated with iodoformized gauze. In the healing there was evidence of a fecal fistula which closed spontaneously. Kiwull expresses the opinion that the distended sigmoid is better evacuated of gas and fæces by the introduction of a rectal tube at the operation, rather than by colostomy. This view stands good to-day. Kiwull states that the seven patients which recovered from the operation have been examined repeatedly since and there have been no recurrent attacks. Nevertheless when we read the detailed histories in not a single instance do we find a note of a later

examination. For this reason I feel that Kiwull's statement as to results cannot be accepted.

Kuhn contributes a monograph (*Beitr. z. klin. Chir.*, 1902, vol. xxxvi, p. 411), from Garrè's clinic, in which he reports 9 cases from his clinic and 95 from the literature. Among these 104 cases, in 20, resection was performed with about 50 per cent. of recoveries.

I have examined these cases of resection critically, and I am of the opinion that resection in acute volvulus is only indicated when gangrene is present. It is a simple procedure to untwist the volvulus and to evacuate the distended bowel by the passage of a rectal tube. In gangrene the loop must be brought out of the abdominal cavity. Now the question arises, what further should be done? I am of the opinion that a lateral anastomosis should be made between the descending colon and the rectum, the gangrenous sigmoid rapidly resected, and the two open ends of the gut sutured in the parietal peritoneum for secondary closure. Kuhn reports one successful resection for gangrene, by Garrè.

Kuhn, from his study, is of the opinion that relief by the rectal tube and enemata will usually fail and that immediate operation is indicated, and that in the majority of cases, if resection is not indicated in the primary operation because of gangrene, it should be done at a secondary operation.

Philipowicz (*Arch. f. klin. Chir.*, 1906, vol. lxx, pp. 678 and 897) has had an unusual experience with volvulus of the sigmoid. In the first place his material is very large. Thirty-two among ninety-eight cases of intestinal obstruction observed in his clinic in Czernowitz, involved the sigmoid flexure. In the second place his mortality is unusually high. Of twelve patients not subjected to operation eight died,—a mortality of 66 per cent. Of twenty patients operated upon, thirteen died,—65 per cent. This unusually large number of cases not subjected to operation and the high mortality of the operative intervention seems to be explained by Philipowicz's faith in the rectal tube which he attempts first in every case and he advises that operation should not be done before the third day.



Scudder of Boston (Reprint 1908, reference not given) reports on 121 cases of acute obstruction from the Massachusetts General Hospital. Among these there are nine cases of volvulus with nine deaths. Among these but two involved the sigmoid flexure. Resection was performed in one, colostomy in the other.

*Conclusions.*—This study of volvulus of the sigmoid must be looked upon as incomplete. My own experience is limited, and the cases reported in the literature are not given with sufficient detail to draw definite conclusions as to the etiological factors.

At the present time, I am of the opinion, that the symptoms of acute or subacute volvulus of the sigmoid are sufficiently evident to allow treatment to be instituted in a stage in which the prognosis should be uniformly good. In the first place, the attempts at relief with the rectal tube and enemata should not be continued more than a few hours. During this time the patient should have no food and no cathartics. If this is unsuccessful the abdomen should be opened at once. When this is done resection is only indicated in the presence of gangrene. After untwisting the volvulus the bowel should be evacuated with the rectal tube. Now one should search in the region of the mesentery for bands or adhesions; these should be relieved and the raw surfaces covered with peritoneal suture. These patients should be carefully instructed, after their recovery, as to their diet and the use of cathartics to prevent constipation. In the event of recurrent attacks resection, as in my Case I, is indicated.

As to the other cases which I have reported in which the symptoms are chronic, laparotomy is indicated not only to relieve these symptoms, but as a prophylactic measure against the development of acute volvulus.

## THE VALUE OF THE CAMMIDGE REACTION IN THE DIAGNOSIS OF PANCREATIC DISEASE.\*

FROM THE PRIVATE LABORATORY OF DR. JOHN H. MUSSER.

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THE diagnosis of pancreatic disease is usually a matter of the greatest difficulty, and any symptom, sign, or test which is suggested as an aid to our diagnostic equipment, should be given a thorough trial before it is accepted or discarded.

Great assistance has already been given by the laboratory worker, for the most part from the study of the fæces, though strangely enough the urine has been grossly neglected. Glycosuria has been urged as a symptom of pancreatic disease, but its absence in the majority of cases robs it of any diagnostic importance, and the same may be said of the other, almost forgotten, urinary findings.

In the Arris and Gale Lecture for 1904, Cammidge<sup>1</sup> reported the result of his extensive research on pancreatic disease, and described a new laboratory test which he claimed to be of great value in diagnosing pancreatic lesions. Based on the fact that acute and gangrenous pancreatitis are usually associated with fat necrosis, and chronic pancreatitis not infrequently, Cammidge believed that even in the latter condition when there was no visible sign of fat splitting, there might still be some change in the chemical composition of the blood. This change he believed might be due to glycerin, but after a few unsatisfactory examinations of the blood for this substance or its derivatives, he devoted his attention to the study of the urine. At this time he made use of two tests, the A and B reactions. Cammidge believed that in certain diseases of the

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\* Read before the Philadelphia Academy of Surgery, November 2, 1908.

pancreas the formation of crystals with the A reaction could be prevented by preliminary treatment of the urine with mercuric chloride, and this formed the basis of the B reaction.

The very unscientific claims urged for the method by Cammidge, and the insufficient grounds for most of these claims, called forth a storm of criticism from subsequent observers (Ham and Cleland,<sup>2</sup> Schroeder,<sup>3</sup> Gruner,<sup>4</sup> Willcox,<sup>5</sup> and Haldane<sup>6</sup>) and the pancreatic reaction as first described, has fallen into almost universal disrepute.

To render the test free of the personal bias of the investigator, Cammidge<sup>7</sup> has modified his reaction, making the technic a little more complicated, but at the same time making the result an absolute one. This third reaction has been named by him "improved method" or "C" reaction, and is the one I have used in the present series of cases.

A portion of the twenty-four hours' urine, or a portion of the mixed night and morning specimens, is examined for albumin and sugar. If albumin is present it is removed by boiling with the addition of a few drops of acetic acid, cooled and filtered. The removal of the sugar will be spoken of later. To 40 c.c. of the filtered, albumin-free, acid-urine are added 2 c.c. of concentrated hydrochloric acid, and the mixture gently boiled on the sand bath for ten minutes following the first evidence of ebullition. A small flask, with a funnel as a condenser, is used for the purpose. After ten minutes' boiling the flask is removed from the sand bath, cooled in a stream of running water, and the contents made up to 40 c.c. with distilled water; 8 Gm. of lead carbonate are then added to neutralize the excess of acid, and after standing a few minutes the flask is again cooled in running water, and the contents filtered through a moistened, close-grained filter-paper.\*

At this stage of the procedure, if sugar has been found on qualitative analysis, a portion of yeast is added to the clear filtrate, and the flask placed in the incubator over night. The next morning the solution is filtered and the test is continued.

\*I have found the most satisfactory paper to be Schleicher & Schüll 589 Blue Ribbon.

The acid filtrate is thoroughly shaken with 8 Gm. of tribasic lead acetate, and the precipitate removed by repeated filtration through a well moistened, close grained filter-paper. To get rid of the excess of lead, 4 Gm. of powdered sodium sulphate are added, the mixture heated on a wire gauze to the boiling point, cooled in running water to as low a temperature as possible, and the precipitate removed by careful filtration. Ten c.c. of the filtrate are put in a small flask, made to 17 c.c. with distilled water, and to this are added 0.8 Gm. of phenylhydrazin hydrochloride, 2 Gm. sodium acetate, and 1 c.c. of 50 per cent. acetic acid. The flask is then fitted with a funnel condenser and gently boiled on the sand bath for ten minutes, at the expiration of which time it is filtered hot through a filter-paper moistened with hot water. The filtrate if necessary is made up to 15 c.c. with hot distilled water, and the whole well stirred with a glass rod.

"In well-marked cases of pancreatic inflammation a light-yellow, flocculent precipitate should appear in a few hours, but in less characteristic cases it may be necessary to leave the preparation over night before a deposit occurs. Under the microscope the precipitate is seen to consist of long, light-yellow, flexible, hair-like crystals arranged in delicate sheaves, which, when irrigated with 33 per cent. sulphuric acid, melt away and disappear in ten to fifteen seconds after the acid first touches them. The preparation must always be examined microscopically, as a small deposit may be easily overlooked with the naked eye, and it is also difficult to determine the exact nature of a slight precipitate by macroscopical investigation alone." (Cammidge, *loc cit.*, p. 253.)

The nature of the phenylhydrazin precipitate is unknown, though Cammidge believes that the body is a pentose, not preformed but obtained by hydrolysis. To quote his words (*loc. cit.*, p. 251), "We are not in a position to make any definite statements with regard to the nature of the mother-substance from which the sugar is derived, but our earlier experiments proved that it was not the so-called animal gum of the urine, and the fact that a positive reaction has not, so

far, been obtained by the 'improved method' with the urine, from any but pancreatic cases, suggests that it is probably a body resulting from change in the pancreas, and possibly derived directly from that organ. The relatively large proportion of pentose-yielding material in the pancreas (2.48 per cent.) . . . points to the pancreas as the most likely source. It cannot be denied, however, that the disintegration of other tissue may also at times influence the urine in this respect, and it has also to be remembered that the ingestion of large amounts of pentose-containing food-materials may also cause small quantities of pentose to be excreted in the urine. Therefore while we maintain that a positive reaction by the 'improved method' of performing the so-called 'pancreatic reaction' is strongly suggestive of inflammatory disease of the pancreas, we are not prepared to contend that it is pathognomic of pancreatitis."

Cambridge's present attitude toward his reaction seems to be a very fair one, as the last sentence of the above quotation indicates. He has made 250 consecutive examinations, of which 125 were negative. These negative reactions were observed in 50 normal cases, 92 miscellaneous cases concerning which no further information is given, 10 cases of gall-stone in common duct, 11 cases of gall-stones in gall-bladder, both conditions unassociated with pancreatitis, and 12 cases of cancer of the pancreas. Two cases of acute pancreatitis gave a positive reaction. There were no negative findings in cases of chronic pancreatitis *sui generis* or of pancreatitis accompanied by gall-stones.

Control work on this "C" reaction has been slow in forthcoming, probably on account of the adverse criticism aroused by the previous reactions.

Watson<sup>8</sup> in a series of 250 analyses from 120 consecutive cases found the reaction positive in such cases as acute and chronic pancreatitis, acute suppurative appendicitis and peritonitis, malaria (jaundice with epigastric tenderness) pneumonia (arteriosclerosis), alimentary glycosuria and constipation, duodenal ulcer and chronic pancreatitis, gall-stones in common duct (pancreas inflamed), pregnancy (alimentary

glycosuria), mitral stenosis (inflammatory disease of pancreas), uræmia, colitis, gout, tuberculous enteritis, constipation, chronic nephritis, cerebral hemorrhage, exophthalmic goitre, gastric ulcer, malignant disease of stomach, leukæmia, chronic bronchitis, arteriosclerosis, nephritis, simple catarrhal jaundice, and lymphosarcoma.

This is a startling variety of conditions and would tend to invalidate Cammidge's claims. Watson arranges the cases giving a positive reaction in the following three sub-divisions:

1. A group in which there is a definite clinical or pathological evidence of serious organic disease of the pancreas, for example, acute and chronic pancreatitis, usually associated with disease of the bile-ducts.

2. A group in which the reaction in the urine is associated with pronounced arteriosclerosis, a condition usually accompanied by more or less sclerosis in different glands.

3. A group in which the reaction is dependent on congestion and catarrhal conditions of the gland duct and substance, with associated toxæmia, for example, advanced heart disease, appendicitis, pneumonia, malaria, and the like.

Despite the many varying disorders which give a positive pancreatic reaction Watson believes the test will prove of great value to physicians and surgeons in the diagnosis and treatment of pancreatic disease.

Edgecombe<sup>9</sup> publishes the report of an interesting case of mumps in which, owing to abdominal pain and tenderness with vomiting, an examination of the urine for the pancreatic reaction was undertaken. Cammidge himself conducted the observation and diagnosed "an active inflammation of the pancreas" based on a positive pancreatic reaction.

Schroeder<sup>10</sup> found a positive reaction in chronic pancreatitis, cancer of the pancreas, cancer of stomach, gall-stones, catarrhal jaundice, tuberculous peritonitis, and tumor of upper abdomen, probably of pancreas. Negative findings were seen in chronic pancreatitis, cancer of stomach, abscess of pancreas, gall-stones (three of four cases), catarrhal jaundice (three of four cases), cancer of liver, cholecystitis, and pulmonary tuberculosis. His conclusions are as follows:



1. It has been proved that inflammatory and destructive diseases of the pancreas may give rise to the appearance of certain as yet undefined bodies in the urine, belonging possibly to the sugars or related compounds.

2. The reaction is not pathognomonic for disease of the pancreas in the clinical sense.

3. Extensive clinical observation on the urine in pancreatic and other diseases must finally determine the value of the pancreatic reaction.

In making my observations on the pancreatic reaction, I purposely chose to exclude examination of any normal cases, as Cammidge has reported 50 normal urines of which none gave a positive reaction. I have so far examined 62 individual cases. In several of these, control-examinations were made, which I have not enumerated. The majority of these cases were from the practice of Dr. Musser, but additional cases were furnished me by Dr. J. B. Deaver, Dr. W. Wayne Babcock, Dr. Joseph Sailer, and Dr. Warfield T. Longcope, all of whom I wish to thank for their courtesy. Great kindness has been shown me by Drs. Sailer and Speese in allowing me to study the urines of their cases of experimental pancreatitis. Full details of these are omitted, as the question of the value of the Cammidge reaction based on experimental and pathological work will be presented in a subsequent paper in conjunction with Dr. Speese.

My series includes only abdominal disorders, and I have tried to select several cases presenting the same disease, as a means of control. The list includes acute experimental pancreatitis, acute pancreatitis, chronic pancreatitis, cancer of the pancreas, cirrhosis of the liver, cancer of the gall-bladder and liver, cholecystitis, cholangitis, gall-stones, cancer of the stomach including cases of mural, pyloric, and cardiac carcinomata, gastric ulcer, gastritis, hyperchlorhydria, gastroptosis, enteritis, renal calculus, fibroid of uterus, autointoxication, and diabetes mellitus. These cases I have tried to arrange in a consistent table, but the combination of several diseases has prevented a systematic classification.

## CAMMIDGE REACTION IN PANCREATIC DISEASE. 189

	No.	Pos.	Neg.
Experimental pancreatitis (acute).....	4	2	2
Acute pancreatitis .....	1	1	0
Chronic pancreatitis .....	2	2	0
Carcinoma of the pancreas .....	1	0	1
Carcinoma of the stomach and pancreas...	2	1	1
Carcinoma of pylorus .....	3	0	3
Carcinoma of stomach wall .....	1	0	1
Carcinoma of cardia .....	1	0	1
Sarcoma of stomach .....	1	0	1
Gastric ulcer .....	2	0	2
Hyperchlorhydria .....	1	0	1
Gastropptosis .....	1	1	0
Gastritis .....	2	0	2
Cirrhosis of liver .....	10	0	10
Carcinoma of gall-bladder .....	2	0	2
Cholecystitis .....	4	0	4
Cholangitis .....	1	0	1
Gall-stones .....	2	2	0
Enteritis .....	1	0	1
Abdominal tumor of obscure origin.....	1	0	1
Renal calculus .....	1	0	1
Fibroid of the uterus .....	1	0	1
Autointoxication .....	2	0	2
Diabetes mellitus .....	14	1	13
Myocarditis .....	1	0	1

Of the 62 cases studied, but ten cases gave a positive Cambridge reaction and in six of these the diagnosis of a pancreatic lesion was confirmed at operation. The case of acute pancreatitis died with all the classical symptoms of the disease, and the diagnosis of the case of carcinoma of the stomach and pancreas was corroborated post mortem. The case of gastropptosis was sent me by Dr. Babcock, with symptoms suggestive of pancreatitis, but revealing a markedly ptosed stomach on examination. As this condition was the prominent feature, I have classed the case under this head, but it is not unlikely that a pancreatitis may have been associated with the gastropptosis. The fourth case was a diabetic woman, a private patient of Dr. Musser, who had been troubled for some time with irregular attacks of indigestion and constipation. Von Noorden<sup>11</sup> says, "To make a diagnosis of pancreatic diabetes in the absence of symptoms referable to marked pancreatic lesion is most daring"—and although this is very true, the

question of the concurrence of pancreatitis with many cases of diabetes must be borne in mind, even though no symptoms are present (Herzog,<sup>12</sup> Ssobolew<sup>13</sup>).

Four cases of experimental pancreatitis were examined, two of which were positive and two negative. The two cases giving a negative reaction were found at autopsy to show barely discernible evidences of pancreatitis. The two positive cases were typical cases of acute hemorrhagic pancreatitis. Further work is being carried on in this direction, and will be reported in a later paper in collaboration with Dr. Speese.

I have studied but one case of carcinoma of the pancreas *per se*, and this gave a negative reaction, agreeing with Cammidge's results. Of two cases of carcinoma of the stomach with metastases to the pancreas, one was positive and one negative, so of the three cases of pancreatic carcinoma, two were negative, giving a percentage of 33 per cent. positive reactions. Cammidge found four positive reactions in 12 cases of carcinoma of the pancreas, or 33 per cent.

The finding of a positive pancreatic reaction in gallstones associated with pancreatitis is a common occurrence, according to Cammidge, but Schroeder found three negative reactions in four cases of cholelithiasis. My cases are not numerous, but confirm the report of Cammidge.

The cases of cirrhosis of the liver were studied with a special object in view, inasmuch as they were all cases in which an alimentary levulosuria has been found after the ingestion of 100 Gm. of levulose. It has been stated by Steinhaus<sup>14</sup> that the principal reason why cirrhotic cases are not able to utilize levulose is because of the common association of a chronic pancreatitis with the cirrhosis. This was based on post-mortem findings, but has not been generally credited, so it was thought of interest to examine all cirrhotic cases for the pancreatic reaction. As will be seen from the table, ten cases were studied, but with no positive reaction. This would seem to point to another interpretation of alimentary levulosuria, as was mentioned in my preliminary report before the Section on Medicine of the College of Physicians last January.

All cases of glycosuria were examined for the reaction, and in but one case was it obtained.

*Conclusions.*—Of 62 cases studied, but ten gave a positive reaction. In seven of these the diagnosis was confirmed by operation or autopsy. One case died with all the clinical symptoms of acute pancreatitis, and in the other two a concurrent pancreatic lesion was not improbable. In no cases other than those presenting clinical evidence was a positive reaction obtained.

I firmly believe the test to be a very useful one and to mark a decided advance in the diagnosis of pancreatic disease. The technic is long and complicated and requires great care, but is one that can be readily mastered and is within the scope of any clinician with facilities for laboratory work. Sometimes the end-reaction is obscure on account of crystals forming which are not properly the osazon described by Cammidge, but observation as to structure and their insolubility in 33 per cent. sulphuric acid suffice to render the diagnosis less difficult.

The test is not pathognomonic, and the discoverer himself has never had the temerity to claim this property for it; but taken in connection with the clinical history and examination, and a careful study of the fæces, the Cammidge reaction is strongly suggestive of inflammation of the pancreas.

NOTE.—Since reading this paper I have studied many more cases and have made between 150 and 200 examinations. The results of these observations are in harmony with the above conclusions.

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- <sup>2</sup> Ham and Cleland: *Australasia Med. Gazette*, 1904, p. 399; *Lancet*, May 14, 1904, p. 1378.
- <sup>3</sup> Schroeder: *Amer. Med.*, 1904, p. 406.
- <sup>4</sup> Gruner: *Lancet*, 1904, May 21, p. 1459.
- <sup>5</sup> Willcox: *Lancet*, July 23, 1904, p. 211.
- <sup>6</sup> Haldane: *Edinb. Med. Jour.*, 1906, n.s. xx, p. 418.
- <sup>7</sup> Robson and Cammidge: *The Pancreas, Its Surgery and Pathology*, 1907, p. 252.
- <sup>8</sup> Watson: *Brit. Med. Jour.*, April 11, 1908, p. 858.
- <sup>9</sup> Edgecombe: *Practitioner*, February, 1908, p. 194.
- <sup>10</sup> Schroeder: *Jour. A. M. A.*, 1908, li, p. 837.
- <sup>11</sup> Von Noorden: *Die Zuckerkrankheit*, fourth edition, p. 158.
- <sup>12</sup> Herzog: *Virch. Arch.*, 1902, clxviii, p. 83.
- <sup>13</sup> Ssobolew: *Virch. Arch.*, 1902, clxviii, p. 91.
- <sup>14</sup> Steinhaus: *Deutsch. Arch. f. klin. Med.*, 1902, lxxiv, p. 537.

# THE PREVENTION OF INTESTINAL OBSTRUCTION FOLLOWING OPERATION FOR APPENDICITIS.\*

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IT may safely be said, I think, that in this country each succeeding year has brought with it an increasing number of cases of appendicitis which have been diagnosed as such at an earlier period in the disease. With this advance in diagnosis has also come an increase in the number of cases that have been operated upon. In fact there is hardly at present a community of fair size that does not count among its numbers one or more surgeons who have operated a number of times for appendicitis. After having diagnosed the case properly, removed the diseased appendix, closed the wound with or without drainage as the case may be, and returned the patient to bed, there ensues for all surgeons a more or less anxious period lasting from several days to several weeks. Of the post-operative complications liable to occur during this period, intestinal obstruction and sepsis form a serious percentage.

A number of cases of postoperative obstruction in which the writer has been called in to operate within the last few years have led him to consider more closely the causes of this complication in these individual cases and the methods by which it may usually be avoided.

This postoperative complication is not an infrequent one—it varies from a fraction of one per cent. to ten per cent. or more according to the operator's skill and experience.

The obstruction is usually either (a) mechanical or (b) septic, or a combination of both. There is also a so-called

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\* Read before the New York Surgical Society, November 25, 1908.

spasmodic form about which authorities differ greatly. The occurrence of this form is doubtless quite rare. It is not here considered, nor is that resulting from mesenteric thrombosis.

#### a. MECHANICAL OBSTRUCTION.

As a postoperative complication this occurs less often than we would expect in the cases where the conditions would seem at first thought to be most favorable for it—namely in those of acute generalized suppurative peritonitis with the production of many adhesion bands. The reason that many cases of this kind are free from this complication is doubtless that here many of the loops are united to each other by the exudate while they are in a normal position and are thus held together for some time—the later process of absorption occurring pretty evenly over the various surfaces if the focus of inflammation has been removed. The comparative rarity of mechanical obstruction in cases of pyosalpinx, and especially tubercular peritonitis where the greatest amount of adhesive material is often formed, would tend to corroborate this view.

The type of case most liable to this postoperative complication seems to be that in which most of the peritoneal cavity is free from adhesions, permitting unrestricted intestinal motion, but where a few firm adhesions are formed after operation between the caput coli and an adjacent loop of small intestine. Gibson<sup>1</sup> in 1000 cases of postoperative intestinal obstruction found the small intestine involved in 95 per cent. McWilliams<sup>2</sup> collected 86 cases of postoperative obstruction—all in the small intestine—69 following appendicular abscess.

The following cases are fairly typical of this condition:

CASE I.—E. W., 25 years of age, male. Had been operated on by his physician on Long Island for chronic appendicitis on June 15, 1907. Considerable inflammation had been found at the tip of the appendix which had to be dug out from its adhesions over the pelvic brim. The appendix had been removed and a

<sup>1</sup> Gibson, *Ann. Surg.* Vol. 32. p. 425.

<sup>2</sup> McWilliams, *Wash. Med. Ass.* 1905.



cigarette drain placed to the stump area. The patient had done nicely for a few days following the operation and the drain had been withdrawn and partially replaced. He had then begun to vomit occasionally, the intervals between the attacks becoming of shorter and shorter duration. The bowels which had moved well at first had become constipated and finally the enemata had returned clear, only a very slight amount of gas being expelled. The pulse rate had remained 80 to 100 and the temperature normal. Nine days after the operation the vomiting had become fecal. I saw him late this same day for the first time; he looked distinctly anxious, the pulse was about 100, with appreciable tension; the temperature was normal. The abdomen was moderately distended and a little tender; no mass could be felt. On listening to the abdomen with a stethoscope for several minutes only two very faint gurgles were heard. No peristaltic waves could be seen; there was no dulness in the flanks. On rectal examination no mass could be felt and the examination was not painful. A diagnosis was made of mechanical intestinal obstruction. Immediate operation was advised and accepted. Under gas and ether anæsthesia an incision was made (Dr. Hawkes) to the umbilical side of his previous incision, through the outer fibres of the right rectus muscle. The peritoneum was not adherent here. There was no free fluid in the general peritoneal cavity. A twisted loop of small intestine was found adherent to the caput coli at the site of the drain, on the umbilical side of the caput. The bowel above the obstruction was dilated and thickened, below it was contracted and entirely collapsed. There were no adhesions to be felt in the pelvis or elsewhere in the abdomen. The twisted loop was separated from its adhesion area to the caput coli. Its adhesion surface was oval, of about one to one and a half inches in diameter. In a few minutes the contents of the bowel above were slipping past the area of previous obstruction and the diameter of the bowel below was distinctly increased. After the separation from the caput coli the affected loop was seen to lie directly under the recent abdominal incision, where it was allowed to remain. The cigarette drain was removed from the old wound and a small piece of rubber tissue was introduced into the outer part only of the sinus tract. The fresh wound was closed in layers, leaving in only a small piece of gauze as a drain down to the peritoneum. The patient made a good recovery. His vomit-

ing stopped and his bowels moved of their own accord within twelve hours and after that regularly. His convalescence was interrupted ten days following the operation by a small collection of pus which formed in the bottom of the pelvis (probably from a small amount of blood that had trickled down into the pelvis at the time of the second operation. This collection bulged toward the rectum, his physician reported, and was there opened by the finger. It went on promptly to complete healing. The patient was heard from six months later. He was then in perfect health.

CASE II.—N. H., 20 years of age, male. Had been operated on by his physician in New York City, July 22, 1907, for gangrenous appendicitis. The abdominal incision had been made at the edge of the right rectus muscle. The appendix had been found behind the caput coli imbedded in adhesions and its removal had been a difficult one. After its removal drainage had been instituted through the abdominal incision. The patient had made a good recovery and his bowels had moved well for several days following the operation. Then he had begun to have abdominal pain with constipation and had vomited occasionally. On the ninth day following the operation, he had begun to have fecal vomiting, the rectal enemata had returned clear and no gas had been passed by rectum. The writer saw him about twelve hours after his fecal vomiting had begun. The clinical picture was almost precisely that described in Case I. Diagnosis was made of intestinal obstruction from a loop of small intestine adherent to the caput coli at the site of drainage and immediate operation advised; consent to this was not obtained for about six hours. Under gas and ether an incision was then made (Dr. Hawkes) to the umbilical side of his previous incision through the fibres of the right rectus muscle. The peritoneum was not adherent here. A condition almost identical with the one described in Case I was found—a loop of small intestine twisted and adherent to the caput coli at the site of drainage to the umbilical side of the caput by an irregular shaped surface—distention and thickening of the loop above the obstruction, collapse below it. After separating the loop it lay directly under the fresh incision, where it was left after its contents were felt and heard to slip downwards, past the area of previous obstruction. The abdominal wall was sewed up in layers, a small gauze drain being inserted

through the muscles only. The patient made an excellent recovery. The vomiting stopped almost immediately. The bowels were moved by enema on the third day and after that regularly. His convalescence was uneventful and he left the hospital in excellent condition.

In both of these cases the obstruction in the loop of small intestine was not at the site of the appendix stump, but corresponded to the area on the umbilical side of the caput where gauze drainage had been instituted. The prevention of the firm adhesion material or band formation in this locality may best be affected by:

a. Making the operative entrance into the peritoneal cavity well out towards the anterior superior spine of the ilium directly over the caput coli.

b. Instituting right iliac fossa drainage when necessary to the outer side of the caput coli.

c. Instituting pelvic drainage likewise when necessary to the outer side of all intestinal coils, by means of a suitable drain, the drainage tract having for its outer wall the lateral parietal peritoneum of pelvis and of right iliac fossa.

d. Protecting the coils of small intestine by means of an omental barrier.

a. *The Abdominal Incision.*—By making the abdominal incision an oblique one from one to one and a half inches within the anterior superior spine of ilium (see Fig. 1) and by splitting the fibres of the external oblique in the same line as the skin incision, a retraction of the outer part of the external oblique aponeurosis will expose the internal oblique muscle nicely; the fibres of the latter are then separated and the transversalis fascia and peritoneum divided halfway between the outer edge of the rectus muscle and the anterior superior spine of the ilium. This will in most cases give an opening into the peritoneal cavity directly over the caput coli. If one attempts to open quite near the anterior superior spine, the result may well be that the dissection will lead down ineffectually into the retroperitoneal tissue, leaving a pocket there for postoperative trouble, or the bowel may be opened without

getting into the general peritoneal cavity. If the opening be made too far out at the edge of the rectus muscle a coil of small intestine may present itself instead of the caput. This is an objection.

*b. The Proper Placing of the Drain to the Stump Area, in the Right Iliac Fossa.*—This I consider to be of great post-operative importance in the cases where drainage is needed. Through such an opening as is recommended above a drain when indicated can be so placed that the secretion will be led up along the outer side of the caput coli and then into the outer dressings (Fig. 1). A drain placed to the inner (*i.e.*, umbilical) side of the caput coli in apposition with coils of small intestine (especially if it be a gauze drain) will of course cause marked adhesion formation and may well give rise to the complication existing in the two cases previously mentioned.

In the gangrenous cases where in addition to the gangrene of the appendix there are spots of juxtaposition gangrene on the caput coli or small intestine, a piece of gauze either as a separate drain or as a part of the distal end of the stump area drain should of course be placed against such spots. Such a drain should, however, be surrounded by rubber tissue throughout the rest of its course in the wound and it should also be led to the surface to the outer side of the caput. It is hard to lay down exact rules as to the amount of drainage necessary in every drainage case. Clinically the principle here enunciated seems sound; one thing also seems certain; the lower abdominal and pelvic peritoneum in the male cannot take care of infection as does this organ in the female and requires as a rule provision for more ample drainage. Rubber tissue and gauze cigarette drains without gauze projection from the lower end unless there be a gangrenous spot to cover, represent to my mind the best form of drain for the average case that requires drainage.

*c. The Institution of Pelvic Drainage.*—When the pelvis is to be drained the pelvic drain should preferably be of rubber tissue and gauze, the rubber tissue being wrapped around the

gauze loosely, leaving likewise no gauze projection from its lower end. In this way the greatest amount of drainage with the minimum amount of adhesion formation is secured. This drain should always be introduced (under the guidance of the fingers of the other hand) so that it lies directly against the outer pelvic wall from the abdominal incision down to the very bottom of the pelvis. The failure to introduce such a drain to the very bottom of the pelvis may result in the formation of a pool in Douglas's or in the rectovesical pouch, which may in time give rise to further peritonitis causing mesenteric thrombosis or intestinal obstruction. This pelvic drain needs as a rule to remain in the pelvis not more than thirty-six hours in a comparatively recent case of spreading peritonitis with serum only or slightly turbid seropus in the pelvis. In the older cases, however, associated with heavy and scattered lymph plaques in the pelvis and localized pus collections there, a more prolonged pelvic drainage is indicated. In these latter cases a too early discontinuance of the pelvic drainage may be followed by pelvic re-accumulation of pus with subsequent intestinal obstruction. Cases with a perforated gangrenous tip located deep in the pelvis should be similarly drained. Localized collections of pus anywhere in the abdomen are inviting areas for intestinal obstruction. When it is possible it is advisable to open these so that the gravity drainage from them will be along the tract of the pelvic drain. Should this not be feasible they should be drained through that portion of the anterior or lateral abdominal wall which is nearest to them.

Retrocæcal or retrocolic abscesses may best be drained usually through an additional counter opening in the flank (see Fig. 1). Here on account of the position of the abscess plain gauze may be used as a drain or preferably a cigarette drain of gauze enveloped in rubber tissue but with an inch or so of gauze projecting from its lower end. The gauze portion soon becomes adherent to the retrocæcal or retrocolic cellular tissue and thus prevents this drain from being extruded by the action of the lateral abdominal muscles. About the fourth or fifth

day such a drain may be removed with very slight discomfort to the patient. The writer does not feel that the introduction of sterile salt solution into the peritoneal cavity in cases of gangrenous appendicitis is advisable. Many of them have the gangrenous part of the lesion confined to the right iliac fossa or in a limited way to a small portion of the upper part of

FIG. 1.



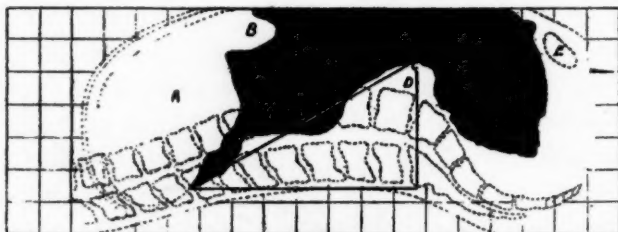
Diagram illustrating the proper placing of the various drains and of the protecting omentum. A. The drain to stump area, leading down on the outer side of the caput coli; rubber tissue and gauze cigarette drain without any projection of selva gauze from the lower end. B. The pelvic drain, leading down to bottom of pelvis on the outer side of all intestinal coils; rubber tissue and gauze cigarette drain, no projection of selva gauze from the lower end. C. Protective omentum placed between appendix stump site and small intestines. D. Drain leading to site of retrocaecal or retrocolic abscess by secondary "stab" opening in flank; rubber tissue and gauze cigarette drain with  $\frac{1}{4}$ -1 in. selva gauze projection from inner end. E. Caput coli. F. Loops of small intestine.

the pelvis. Here the salt solution may scatter a secondary previously localized form of infection to other parts of the lower abdominal and pelvic cavities. When a drain is used it should never be nipped at its exit from the peritoneal cavity by too tight suturing. If so it acts as a stopper, not as a drain. Of course the best way to prevent firm adhesion is to operate early if possible in cases of appendicitis at a time when drainage will probably not be necessary. When the condition



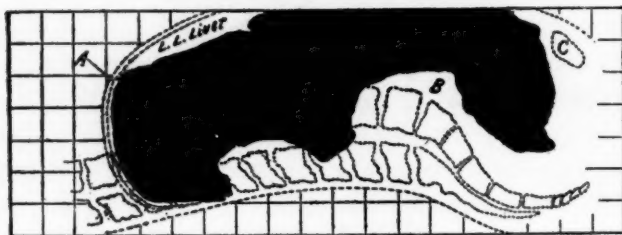
demands drainage, however, the lightest form of adhesion production with the greatest amount of actual drainage should be aimed at. And here while on the subject of drainage it is pertinent to recall that if we wish to drain other parts of the abdominal cavity which are not in direct contact with the capillary drain, yet not shut off from it by adhesions, we must

FIG. 2.



The right flank is here seen one inch deeper than the pelvis.

FIG. 2 a.

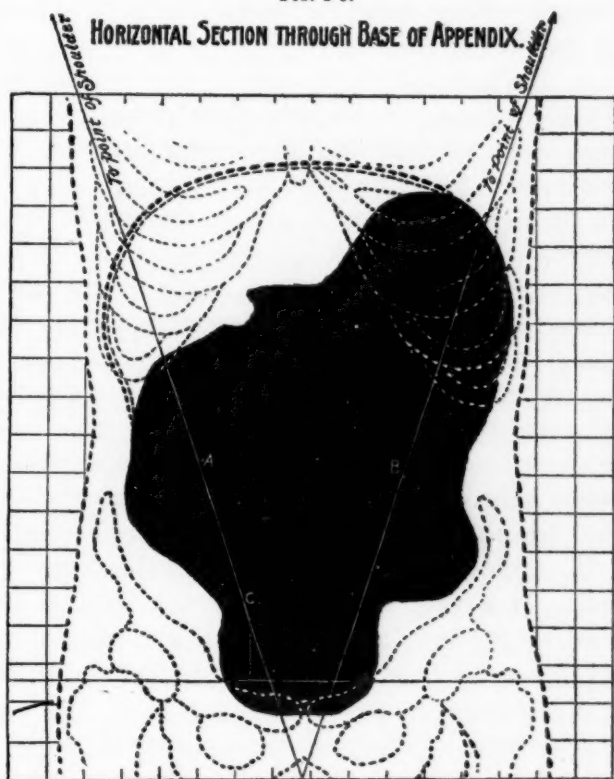


The left flank is here seen even slightly lower than the right.

avail ourselves of the forces of gravity toward this drain. A complete emptying of these other parts into the drain should occur within the first twelve to eighteen hours after the operation, for it is exceedingly doubtful if any drainage occurs after this time (whatever form of drain be used) from portions not in contact with the drain. In the writer's experience the least irritating of all drains, the loosely rolled cigarette drain with rubber tissue covering without any projection whatever of gauze from its lower end, will drain adjacent regions perfectly (if adhesions have not formed in them before operation and if the fluid to be drained is not too thick) for twelve to eighteen hours, no more.

Fortunately this is often sufficient if the drain is of adequate size and the patient kept in the proper position in bed. The accompanying diagrams reproduced in part from Dr. R. C. Coffey's<sup>3</sup> article and showing the various fossæ to be drained

FIG. 2 b.



Considering Fig. 2 and Fig. 2 b together it will be seen that if the patient is first turned over on the right side while in the horizontal position, and then put up in "Fowler position," perfect gravity drainage of all fossæ may be secured.

explain at a glance the proper position in which the patient is to be placed for drainage in various classes of cases. For instance, in cases of retrocæcal abscess alone without free serum or free seropus in the abdominal or pelvic cavities the dorsal position with lumbar opening in the right loin is indicated. In a case of retrocæcal abscess with free serum or free

<sup>3</sup> Coffey, J. Am. Med. Ass., March 16, 1907.

seropus in the abdominal and pelvic cavities pelvic drainage and lumbar counter-opening with the Fowler position for about twenty-four hours is best. Clinically the pelvis will by that time have drained off the serum or seropus that has gravitated from above and the patient may then be placed in the horizontal position, when the lumbar drain will continue its work; or the patient may from the start be simply turned over entirely on the right side, for in this position the lumbar and pelvic drains together, if properly placed, should drain the whole abdominal cavity above. The former method, however, the writer believes to be the better one.

The placing of gauze or of pads to the umbilical side of the caput coli in clean cases as a routine procedure during the operation seems to the writer to be a faulty technic; they are apt to cause adhesions, they often interfere with rapid and satisfactory manipulations, thereby causing delay, and they may very well produce displacement in the way of twisting of the small intestinal loops. When removed they probably often pull the small intestinal loops into abnormal positions where they become adherent. In the pus cases or in cases associated with great intestinal distention their use may be necessary; as few as is possible, however, should be used. Their proper introduction is a very important matter. They should be introduced only after the exact site of the caput coli and appendix region has been noted. Care should be used that no coils be caught between them.

A secondary infection of the peritoneum during the operation from the hands of operator, assistants, or nurses must be avoided. Sterile rubber gloves should be worn by all. The operator's gloves should be of the lightest weight to secure the greatest delicacy of touch, and the best appreciation of the exact pathological changes that have occurred in the operative field.

The delivery of the caput coli outside the abdominal wound as a *routine* measure in hunting for the appendix is a procedure which is both unnecessary and injudicious. In many cases the location of the appendix can be made out after

the peritoneum has been opened, by introducing one finger to the lower part of the caput coli and exploring in this region. When thus located if there are softish adhesions they may be carefully separated by the finger until the appendix seems free and a small sponge or bit of gauze on a holder introduced below the appendix will then often deliver the appendix nicely into the wound, without a single coil of small or large intestine displaced out of the wound. Even in pus cases the same steps may be carried out after the sponging out of the abscess cavity. Of more importance still than the retaining of the caput in the peritoneal cavity is the retaining of all small intestine coils; these are very apt to become displaced with the caput and to be replaced in a wrong position. All peritoneal surfaces of the bowel that are handled and exposed to the air for any length of time are traumatized thereby and the musculature more or less temporarily paralyzed. It is not at all unusual to see appendectomy cases where no portion of the intestine except the appendix has been brought out of the wound during the operation, and where no pads have been introduced, recover their intestinal tone within twelve to fourteen hours as evidenced by the passage of quantities of gas by rectum within sixteen to eighteen hours after the operation.

In women the pelvic drainage may be brought from Douglas's cul de sac through the vagina. There is a chance here, however, that a pool may form in the undrained fossa between the anterior surface of the uterus and the bladder. For this reason I prefer the pelvic drain which issues by the abdominal wound, and by having the patient, who is in Fowler's position, turned well over occasionally on the right side this fossa will drain into the pelvis nicely. In the writer's experience young children who toss about a good deal after operation thereby secure for themselves unwittingly excellent drainage.

*d. Omental Protection of the Small Intestines.*—After the removal of the appendix (and the placing of the drain or drains if required) whenever possible a piece of the great omentum should be brought down from above and placed as a

barrier between the coils of small intestine and the stump site (see Fig. 1).

This latter procedure is not practised by many surgeons. The writer's statistics in postoperative appendix work lead him to regard this as a very valuable prophylactic procedure, which he has made use of as a routine measure for a number of years. It simulates in a way nature's method of preventing the further spread of peritoneal infection and adhesion formation to intestinal loops. In most cases this omental protection can be effected. Where no omentum can be seen the appendix stump can often be placed under the fold of a divided meso-appendix, or under the ileocaecal fold, or a fatty tab from the caput can be brought over it.

It would seem that mechanical intestinal obstruction is of more common occurrence in cases of appendicitis which have not been operated on, than in those where operation has been properly done and the after-care of the wound properly carried out. In the former type of case the adhesions being often older are apt to be more firm and unyielding. They do not tend so much to be absorbed because the cause of the adhesion formation still persists. Old adhesion strings found in the abdominal cavity at the time of operation had usually best be divided close to their origin.

#### *b.* SEPTIC OBSTRUCTION.

In most of the cases of septic obstruction following an operation for appendicitis, this condition is but the result of the further progress of the sepsis that existed before the operation. The means to be taken therefore to prevent further spread of the septic peritonitis are the ones that should be used to ward off the secondary obstruction. In brief these are:

- a.* Removal of the appendix (if it can be done quickly).
- b.* Free drainage of the inflammatory area surrounding the appendix site, in the way mentioned.
- c.* Free drainage of pelvis (if the infection has spread to it) according to the methods previously outlined.
- d.* All operative measures to be instituted with the greatest rapidity consistent with safety.

*e.* Assumption of Fowler's position directly after the operation (at an angle about  $80^{\circ}$ ).

*f.* Rectal instillation of hot normal saline solution, *p. o.*

*g.* Absolute intestinal rest by withholding all food and medication by mouth for 36-48 hours.

*h.* Stimulation as indicated.

*i.* Careful post-operative wound treatment.

*j.* If the above are not sufficient then "ileostomy."

In a case of spreading septic peritonitis following the operation, as soon as the diagnosis is certain, if the free drainage above mentioned is insufficient, the surgeon should not await the advent of fecal vomiting but should open the loop of small intestine which is nearest to the caput coli in the wound; a rubber drainage tube of suitable calibre should be introduced into the proximal loop and retained therein by a purse-string suture. Should this loop be not adherent at the time to the surrounding surfaces a small piece of gauze should be placed around the suture line to produce protective adhesions. The resulting fistula may be closed later after the bowel has regained its tone. The following case demonstrates the value of this method.

T. B., 50 years of age, dentist, had a mild attack of appendicitis in 1906 from which he recovered nicely; he was laid up at that time for only a day. His physician advised him to have his appendix removed in the interval, but this advice was not followed. On May 2, 1907, he was seized with vomiting and abdominal pain. His physician saw him soon after the onset and found temperature and pulse rate normal, very slight abdominal tenderness and scarcely appreciable right rectus rigidity; his bowels moved well by enema. Within twelve hours, however, his pulse rate had advanced to 96, his temperature to  $101^{\circ}$  F., and he presented distinct rigidity over the right rectus and lateral abdominal muscles with exquisite tenderness over the appendix site; shortly afterwards he had a chill. Rectal examination was negative. He looked badly. The writer insisted on immediate operation and found a gangrenous appendicitis with a septic peritonitis confined to the right iliac fossa. The intestinal loops there seen were covered with lymph flakes, and the right iliac



fossa contained a turbid yellowish serum. The appendix was rapidly removed and a rubber tissue and gauze cigarette drain of fair size placed to the stump area. During the first thirty-six hours after the operation the patient did not do well; vomiting occurred at intervals, at first mucous, then fecaloid, but not containing any fecal material; the abdomen became quite distended. No gas was passed by rectum. His septic peritonitis was evidently progressing and it was decided to institute freer drainage. The wound was opened, no mechanical obstruction was found, but a considerable amount of brownish-gray fluid with a foul odor around the bowel loops. This was sponged out and three cigarette drains were inserted; one above towards the liver, one to the stump area on the outer side of the caput coli, one into the pelvis on the right side along its outer wall. The patient was placed in Fowler's position. The vomiting, abdominal distention and absolute constipation, poor pulse, and general prostration persisted in spite of this free drainage. Very rarely a weak gurgle could be heard with a stethoscope over the abdomen. There was still evidently a progressing paresis of the gut, so it was decided to open the nearest loop of the small intestine. This was done about sixty-six hours after his first operation, a rubber drainage tube being sutured into the proximal loop and gauze applied sparingly around the suture line for protective adhesion. This was followed by the expulsion of much gas through the tube and a little later of a large amount of foul smelling greenish material containing particles of undigested food which he had eaten more than four days before. Similar material was obtained after the operation by gastric lavage. Following this ileostomy the vomiting stopped almost immediately and in twelve hours the whole clinical picture had changed; the abdominal distention became less, the patient looked much better, the pulse was greatly improved. Within twenty-four hours the bowels moved with enema by the rectum with the passage of much gas; he then went on slowly to recovery. Later his ileostomy wound was closed.

*Postoperative Treatment of the Wound.*—Where multiple or deep drainage has been instituted the proper replacement of these drains at needed intervals is a matter of great importance to the patient. It is the writer's practice on this account to give an anæsthetic as a rule for the first dressing

in these cases, so that the proper replacement of the drains to the very bottom of the tract may not be interfered with by the reflex muscular contraction of the abdominal muscles, which otherwise often force the adjacent intestinal walls into the drainage tract and also narrow its mouth. I believe that where possible the operator himself should do the first dressing. An assistant will often fail to carry in his mind the exact depth and direction of the various drainage tracts and a previously drained pocket may thus be left undrained. The value of a voluminous *damp* gauze dressing into which the ends of the drains are fluffed is beyond question and it is the writer's practice to change this every 8 hours for the first 2 days, for it promotes free drainage in a marked way.

*The giving of special drugs* to produce marked intestinal motion or catharsis directly or within 2-3 days after operation has always seemed to the writer an inadvisable procedure. Nature splints the abdomen when it is endeavoring to rid itself of septic material that is present, as shown by the presence of muscular rigidity. We should take our cue from this and keep the coils quiet for 4-5 days usually, emptying the lower bowel by enema as required in the meanwhile.

## ACCIDENTS IN HERNIA OPERATIONS.\*

WITH ESPECIAL REFERENCE TO THE VESSELS.

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IN presenting this subject I have incorporated only those cases occurring in the practice of members of this Society; being impressed with the fact that the majority are teachers in medical schools, and that all members must be Visiting or Assistant Visiting Surgeons to some New York Hospital. This latter being the case, accidents of this nature by the members of such a society will have a marked relative value to the teaching surgeons, and also be of marked interest as a factor in impending or prospective suits.

Consideration of the dangers during an operation for the radical cure of hernia, especially by the Bassini method, should include those of the bladder, intestines, vas deferens and the vessels. Reference only is made to the subject of injury to the vas, as no further serious outcome can result from this injury than sterility of the side of trauma, and even this can be obviated by proper suture of the divided structures, if recognized at the time of the operation.

The bladder is a frequent enough content of hernia, and is made so, often enough, by dragging the sac farther down than necessary to meet with the proper technic relative to this step. Although several cases have been reported to me by the members, this subject has received sufficient attention in the literature of the day without my recording these cases. The point in question was well made in a paper recently written (but not yet published) by Dr. Roland E. Skeel of Cleveland, and read by him before the American Association of Obstetricians and Gynecologists at Baltimore on September 24, 1908.

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\* Read before the New York Surgical Society, November 11, 1908.

He further called attention to the fact that the bladder-wall of the paraperitoneal variety of vesical hernia occasionally was so thin, and lacked the usual vascular and muscular appearance of bladder-tissue, as to be mistaken for the sac wall of a hernia, and incised before the true condition was evident; further stating that the urine escaping from these incisions in several cases was taken for serum of the usual peritoneal variety. He advocated the administration of methylene blue for several days before the operation in all cases where there was a suspicion of the possibilities of the bladder being in the hernial protrusion, so that the colored urine escaping from the injured bladder would be recognized as such. He further stated that some of the injuries, one a case of his own, were due to tying the ligature of the sac about a portion of the bladder that was evidently dragged into this region by pulling the neck of the hernial sac far out, thereby producing the vesical hernia rather than having it at the beginning of the operation. This production of a hernia of the bladder was demonstrated by me in doing a repair for a direct hernia three weeks ago. While dragging on the sac to place a suture ligature the bladder fundus was observed for a length of one and a quarter inches to the inner angle of my wound. Germane to this is the following,—a portion of the replies sent me by Dr. George D. Stewart:

“Another danger that I do not think is sufficiently emphasized is that of wounding the bladder. This is more frequently the case in femoral hernias, of course, but it is also to be seriously considered in inguinal hernia. In two instances, which I recall, inflammation had caused adhesions of the sac to the bladder. The latter was dragged out through the inguinal canal as a part of the hernial mass. In two instances I have seen the bladder wounded, and in one I have opened it myself.”

Two cases of injury to the bowel are reported to me by members of this society, one in a large sliding or slipped hernia, where the sigmoid was opened and subsequently sutured without any following evil result. In the other the sigmoid was evidently grasped in one of the deep sutures, as

a fecal fistula or artificial anus developed in a few days and continued for several weeks, with an eventual repair without secondary operation.

Injuries to the femoral vessels in inguinal hernia are due to several important factors, among which are: (1) an anomalous distribution of the branches; (2) the needle; (3) the suture material as a contributing rather than as a primary cause; (4) the method of passing the needle from above or from below; and (5) exposure, etc., of the ligament. Injuries to the femoral vessels in femoral hernia so far reported to me by members of the Society were of the vein, explained very easily by the relationship of the vein to the saphenous opening. The branches of the femoral vessels likely to be involved in passing the needle would be any of the ones above the profunda, and they are, from above downward,—the superficial epigastric, the superficial circumflex iliac, and the superficial and deep external pudics. The involvement of any of the above branches, except the superficial epigastric, would in a normally placed set of branches imply reckless suturing, and suturing not of the kind as described by Bassini. Two cases of injuries to the deep epigastric, supposed at first to have been the femoral, are reported to me by two of the members of the Society.

In my case reported below, in passing the needle from above downwards I cut off the superficial epigastric flush with the wall of the femoral, and more than likely took off some extra portion of the wall, as the subsequent dissection of the vessel preparatory to ligation showed a perfectly round opening upon the ventral aspect of the femoral the size of an ordinary silver probe, or about 2 mm. in diameter (see Fig. 1).

*The Needle.*—All kinds of needles have been used, and I find upon collecting the returns from the answers to questions sent out by me to all the members, that the greater number use the ordinary Hagedorn. Some use a blunt needle, advocated some years ago as a preventative of the very class of danger under consideration in this paper. The needle in my case, without question, was the cause of my misfortune.

Dr. Gerster also claims the same cause in his case. The needle which was given me was a large, full-curved, so-called fistula needle, or a powerful triangular surgical needle, the edges being as sharp as a knife. Objection was raised to such a

FIG. 1.

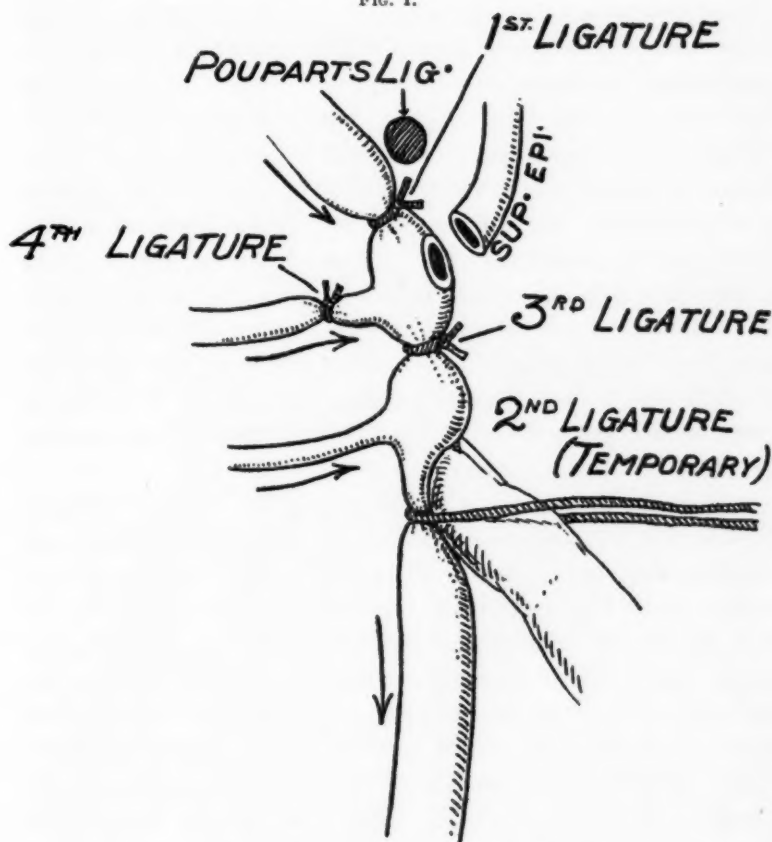


Diagram showing relations of wound in artery.

needle being given me, but I was told that no others were obtainable from the department at that time, and that the one I was given was the only one that would take the suture material, a cord-like one-and-a-half mm. kangaroo tendon. Although having misgivings, but taking extraordinary precautions, I used the needle, passing it from above downwards



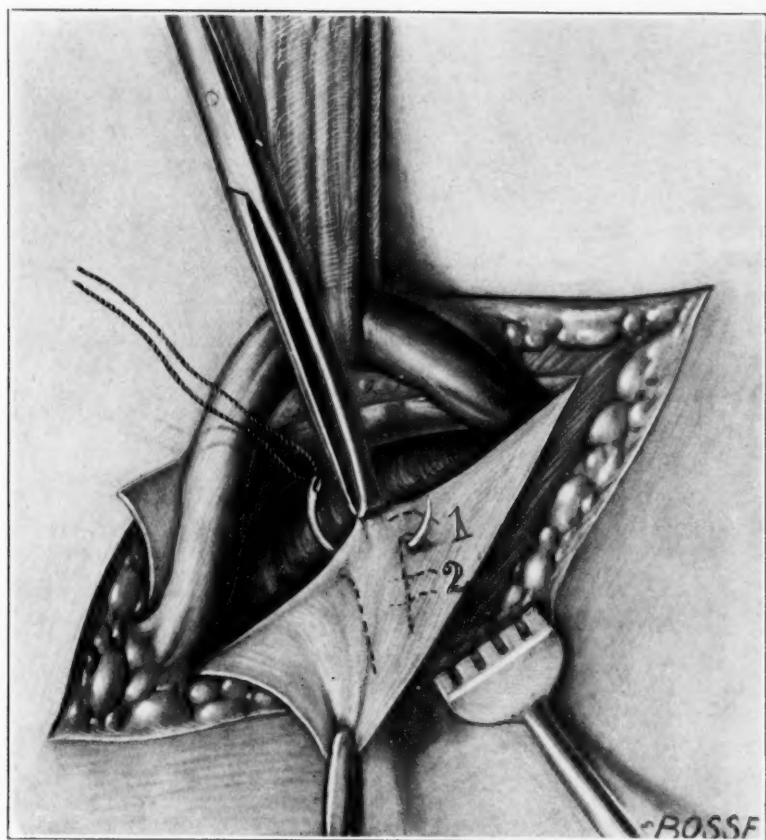
after having carefully palpated the pulsating femoral. The point passed readily and was grasped by the needle holder. A quick jerk to carry the large suture through was followed by a profuse flow of dark blood, which was suspected as coming from an injury to the femoral vein (see the history).

There is now no question in my mind that as the full curve and sharp edges passed through the aponeurosis the superficial epigastric was cut, say just below its base, from the femoral (see Fig. 2—the needle passing around the dotted line representing the superficial iliac artery). The suture material, dense, large, hard kangaroo tendon, such as I was forced to use on my case, is without question a dangerous suture material, as the necessary tugging, etc., to make it pass through the tissue in which a needle puncture may have accidentally been made in either vessel will not tend to any other result than that of enlargement of the puncture, while a soft or small suture material might act as a hæmodynamic in filling the puncture, and also in closing the opening by the final knot application.

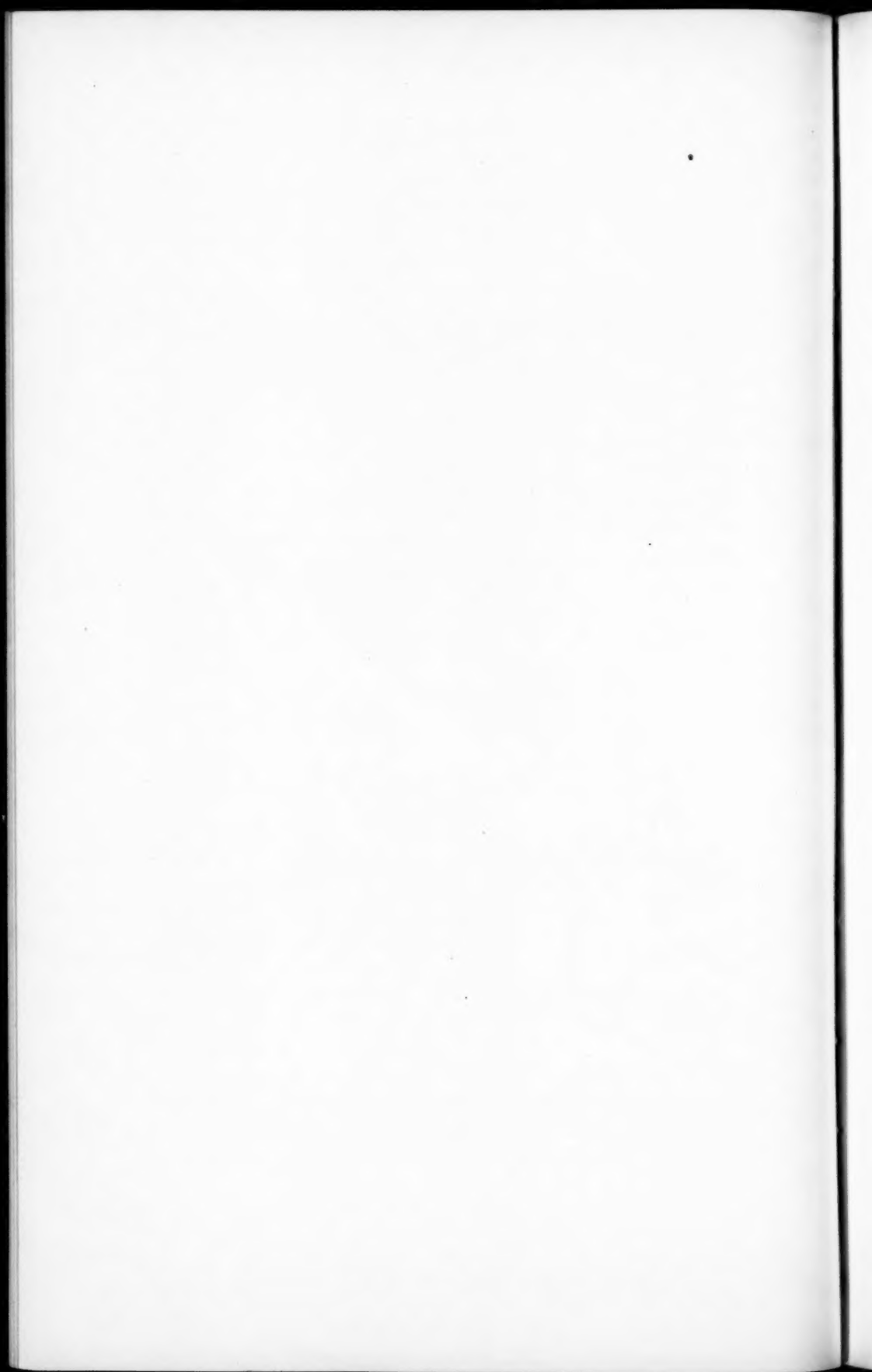
*Passing of the Suture.*—No particular light is obtained by the answers received from the members addressed. I can conceive only in an academic sense that the passing of the needle from above downward is less hazardous than in the reverse; that in passing the needle from below upwards one directs the point of the needle toward the wave pulsation of the vessel, while in the passing of the needle from above downwards one follows the stream, so to say, and the wave pulsation will cause the artery to strike the curve of the needle rather than the point, as in the method from below upwards. I fully believe that if the ligament is grasped and carried well upward it is not material how the needle is passed (see Fig. 2—forceps grasps the shelving border of the ligament and pulls it upwards).

*The Ligament; Exposure and Traction Upon It.*—Unless the ligament be thoroughly cleared, and traction be made upon its shelving border, as shown in the illustration, the danger of injury to the vessels is intensified. Should these arguments

FIG. 2.



Shows forceps grasping the shelving border of Poupart's ligament, to retract the same as far as possible from the vessels; also shows the needle being passed from above downwards, and passing about the high-placed superficial epigastric (1). Normal site of the superficial epigastric (2).



be true, then as a prevention against these accidents it will be necessary to consider the needle, the method of passing the suture, the suture itself, and finally such precautions in regard to the ligament as will give us the best picture of the shelving border, and that which will give us the greatest room between the ligament and the vessel.

*The Needle.*—Although a goodly proportion of the Society use the Hagedorn needle, I cannot but feel that safety will be enhanced by the use of a round needle with a sufficiently large eye to take the suture material.

*Passing the Suture.*—In passing the suture one can follow down the artery with less danger of having the artery transfix itself upon the needle than by passing the suture from below upwards. The suture material should be soft and pliable, not stiff and wiry.

*The Ligament.*—Clearing away all areolar tissue, having the field perfectly dry from blood so as to be able to observe the glistening interior surface of the aponeurosis, and then grasping the shelving border in a pair of forceps (see Fig. 2), preferably applied over the site of the femoral vessels, which have been previously well defined by the palpating finger, and then passing the suture as advised above, will, I believe, minimize the danger of injuring either the vein or the artery in this operation.

#### TREATMENT OF THE INJURED VESSELS.

*The Vein.*—In this structure our ill-luck has a fortunate side to it. We can ligate laterally, and should the injury be too large for ligation suture can be done much more readily than in cases of arterial injury.

*The Artery.*—Lateral ligation is out of the question, and either suture of the vessel, or allied methods of arteriorrhaphy of Brewer and Halsted, or ligation distal and proximal to the injury must be done.

There were forty-one responses by the honorary and active members of this Society to fifty-two requests sent out.

Some of the members were out of town at the time the final statistics of the paper were made up. The following cases of injury in inguinal hernia are recorded:

CASE I.—Iliac artery; ligation after unsuccessful trial at suture; no untoward result.

CASE II.—Femoral artery in a male; ligature; gangrene; amputation; recovery.

CASE III.—Femoral artery (see history of my case).

CASE IV.—Femoral artery; ligature; gangrene; amputation; death.

By one member, three cases of the femoral vein. In two of these cases the bleeding was checked by tying the suture, while in the third a large hæmatoma developed in ten hours, requiring removal of the sutures down to the kangaroo tendon, and then firm packing being applied, was successful in checking the bleeding. None of these cases were seriously involved.

One member reports a case of injury to the deep epigastric artery, with ligature, and also one of injury to the deep epigastric vein with ligature. Another member reports two cases of injury to the deep epigastric vein, with ligation, supposed at first to have been of the femoral vein. He is not positive now, but thinks they were of the epigastric. Mass ligatures were used to check the hemorrhage.

Two other cases, authentic, of injury to the femoral vein, are reported to me as occurring in the practice of members from whom I have not heard. Both these cases are said to have resulted favorably.

In all these cases the injury was recorded as being due to the needle.

*Femoral Hernia.*—No injury of the artery has been reported to me. The following are the instances of the vein being punctured:

CASE I.—Femoral vein; ligature drawn checked the bleeding; no bad result.

CASE II.—Femoral vein; nothing done; result perfect.

A complete history of my case is reported below. No cases are recorded from the literature of this subject.

CASE I.—Dr. John F. Erdmann's service at Gouverneur Hospital, March 22, 1908. Mr. A. W., Norwegian, silver-

smith, thirty-nine years old, entered the service for a radical operation upon a large right-sided inguinal (direct) hernia. No medical events of note crop out in his history until he was of sufficient age to acquire a gonorrhœa. From the same period of his life he drank a bit more than might class him with the moderate alcoholic, but not with the pronounced *habitué*. He does not recall the period of onset of his hernia, but knows that he has had it for years, and has never used any appliances for its cure or to retard its increase in size. For two months previous to his admission he has used alcohol to excess, and then found the hernia was a source of considerable discomfort. For a week he has had pains of varying degrees of intensity in the tumor, which would extend occasionally to the lowermost portion of his scrotum, and as a result of this pain he entered for treatment.

His physical examination revealed a heart hypertrophied and tumultuous in character. No other physical lesions except the hernia are found. The hernia is found to be a complete (direct) one of considerable size, omental apparently, and reducible in part only.

Operation on March 23. Owing to his late alcoholic habits, and his heart, local anæsthesia was used in the beginning. Upon exposure of the sac contents numerous and extensive adhesions were found. As these were likely to prove troublesome, and the patient was becoming restless, general anæsthesia with ether was given. The separate stages of the operation were passed over smoothly until the placing of the kangaroo tendon. A large fistula needle, perfectly new, with its triangular edges as sharp as a knife, and measuring one and three-quarter inches from tip to eye, was given me, threaded with a strand of hard, wiry kangaroo tendon, such as is supplied by the Bellevue and allied hospitals. Ordinarily I raise no objection to any needle passed me, but this one appeared to me so absolutely an instrument of danger that I called the assistant's attention to it, and requested a different needle. It seems that just at this time we were suffering from a dearth of needles and an inability to obtain more. This was forcibly brought to my mind by the assistant's reply that no needle in the hospital but the one given me would carry a tendon for suture. Bearing in mind the dangerous type of needle, and also the anatomy of this region,



I was more than careful in palpating the site of the femoral. With a remark to the Staff that the femoral was under the finger I began to pass my suture from above (proximally) downwards. The point engaged below and emerged above without giving any evidence of blood, but upon drawing the needle through and giving a sudden jerk to pull the kangaroo through, there was a fearful gush of dark blood. I thought that the femoral vein was punctured, and so expressed myself. Tying or drawing the tendon did not diminish the current of blood. Finger pressure was made and Poupart's ligament cut over the course of the vessel, and an incision made down the thigh over the vessels for a distance of three and a half inches. A careful but rapid dissection was then made and a clamp applied in a pool of blood to the vessel. It was now noted that our artery was at fault, and incidentally the anæsthetist, as our black blood was due to his prodigality in administering the ether. A proximal ligature was applied, but before tying the knot traction was made with pressure on the ligature loop. This controlled the hemorrhage sufficient to allow orientation. The loop was slipped as near as practicable to the opening, and then tied. A distal loop was applied below the forceps and pressure made as in the former instance, and the clamp was then removed. It was now found that hemorrhage continued in a stream of several inches in height direct from the anterior surface of the femoral artery, demonstrating a good collateral supply at this point, at least, from the rear. Dissection showed a large branch, evidently anomalous, passing from the femoral directly behind the point of injury, and that the site of injury was without question that of the superficial epigastric, the opening being rather larger than usual, and I should say, higher placed than ordinary, being practically under the ligament rather than a few lines below. (See Fig. 1.) My distal ligature was then placed proximally a full one-sixth inch more, as another posterior branch was found between the former site of the ligature and the source of collateral circulation. The ligature was then tied and the temporary one removed, a ligature was tied about the posterior supply source, and the wound closed with as near typical repair of the hernia as possible. Considerable blanching of the extremity was observed, but we were sure that some circulation was evident throughout the entire extremity. All proper precautions for

warmth, etc., were observed. No complaint by the patient upon his recovery from the ether.

March 24, pulse felt by some of the Staff in the femoral; foot warm; circulation apparently perfect, but not up to normal. No complaints from the patient, except such as ordinary hernia patients make; wonders why his leg and foot are so carefully protected.

April 1, circulation good; absolutely no untoward evidences.

April 24, patient has been kept on his back longer than the usual hernia case by two weeks. The reasons are evident. Discharged to-day perfectly well.

Called for examination on October 4, hernia recurred to slight degree; no trouble.

*Comments.*—I feel quite satisfied that this injury was caused by the needle sweeping about or around a high placed superior epigastric artery, and as a result of using a large and sharp needle its inner edge cut this vessel from the artery, and in so doing cut it off at its funnel expansion of origin from the femoral; that had I had an ordinary round needle, or even a Hagedorn, the delivery of the needle from behind Poupart's ligament would not have been followed by injury further than that of including the epigastric in my ligature. That had it been in the artery or vein the pulling through of the ligature material would have very markedly enlarged the opening. That a suture of the artery was not practical here for more reasons than that of lack of proper needles for this work. That owing to anomalous branches posteriorly, which apparently corresponded to the anastomotic branches of the circumflex, etc., from the profunda, a better collateral circulation was present after the ligation, and saved in its entirety our patient's limb.

## **A NEW CYSTOSCOPE FOR CATHETERIZING THE URETERS BY THE INDIRECT METHOD.**

**BY PAUL M. PILCHER, M.D.,**

OF BROOKLYN, N. Y.,

Surgeon to the German Hospital; Cystoscopist to the Jewish Hospital.

ALTHOUGH there are many types of cystoscopes offered for sale, still there are but few distinct types which can claim originality in their construction. Kelly has perfected the method of using endoscopic tubes in women, but this has its limitations even in his restricted field.

Nitze devised a cystoscope in which a catheter may be passed through the canal of the cystoscope into the bladder and then, by means of a mechanical device, the direction of the catheter may be so guided that it passes into the mouth of the ureter.

Brenner presented a cystoscope in which it was not necessary to change the direction of the catheter after it passed through the cystoscope, but the cystoscope itself could be manipulated so that the catheter might be made to pass directly into the ureter mouth without becoming bent in its course.

Tilden Brown, in 1898, devised a direct catheterizing cystoscope which was a great improvement over all other types of cystoscope of that class, and allowed the simultaneous catheterism of both ureters.

Casper, of Berlin, in 1901, introduced an indirect double catheterizing cystoscope which was very cumbersome.

Later Brown developed a composite cystoscope which combined a direct catheterizing device and examining telescopes, including a retrograde lens. A year or two later, Lewis, of St. Louis, presented a composite cystoscope which closely resembles the one devised by Brown.

Two or three years ago, Bierhof, of New York, improved the Nitze cystoscope so that the sheath was constructed independently of the telescope which contained the lens and the

illuminating device; without moving the sheath the telescope could be revolved within the sheath so that every part of the bladder might be examined. This instrument, which is made in Europe, has certain distinct advantages.

Each instrument which has been briefly described has certain disadvantages. The Kelly cystoscope requires a large amount of experience for its proper manipulation, and even in the hands of those who have used it most, the results obtained with it are not so satisfactory as those obtained by other methods. In the female, for removal of foreign bodies from the bladder and for local applications for the bladder it is far better; its size, and the consequent dilatation of the urethra which it occasions, are very decided disadvantages; it cannot be used in the male.

The Nitze, which is an indirect cystoscope, is a very attractive instrument, but it, too, has certain disadvantages: first, it is large; second, if it gets out of order it must be sent to Europe for repairs; third, it employs a hot lamp and there is constant danger of burning the mucous membrane of the bladder; fourth, it is impossible to irrigate the bladder and change the medium therein without removing the instrument from the urethra, though it may be done after a very awkward and time-consuming manipulation of the instrument; fifth, the lens cannot be cleansed if soiled; sixth, it is almost impossible, with safety, to withdraw the instrument from the bladder and leave the catheters in place because of the direction of the catheters themselves in passing from the canals in the cystoscope to the ureters, as they are curved in their course and are twisted on their own axis, and bind between the cystoscope and the urethra, and are subjected to so much friction that one cannot be sure that the catheter is not withdrawn from the ureter at the same time that the instrument is withdrawn from the urethra; seventh, the lever which directs the course of the catheter may easily become locked so that it does not lie flat upon the instrument and serious injury may be done to the mucous membrane; and eighth, the instrument is so constructed that the complicated parts cannot be removed by the physician and properly cleaned.

The Bierhof instrument was a distinct advance and allowed the dismemberment of the instrument so that the component parts could be much more easily cleaned. There is one danger connected with his lamp-containing telescope, and that is, the joint between the lamp-carrier and the telescopic tube is so placed that if the beak of the instrument should become caught in the bladder wall, it would be possible, in turning the handle of the instrument, to unscrew the lamp and leave it in the bladder. A second point of disadvantage is the difficulty experienced in preventing the fluid from leaking out alongside the catheter, so that only one size of catheter may be used; also, the instrument presents the same difficulty found in the Nitze in removing it, the catheters are so twisted and bent that it cannot be done without the danger of pulling out the catheters from the ureters.

In the instrument devised by the writer, the aim has been to eliminate some of these disadvantages: first, the instrument is made up of three parts that may be disassembled and thoroughly cleaned; all excepting the telescope, containing the lens, may be boiled and sterilized as you would any other instrument. The telescopic tube (*Fig. A*) is complete in itself, containing the lamp and lens; this may be used by itself as a simple examining cystoscope; its size is number 14 French. Attached to this telescope is the device which carries the catheter tubes and a new type of deflector; these catheter tubes may be open or closed as the user desires. The deflector consists of a simple piece of steel hinged on a pinion between two parallel steel-wire bars; as the deflector is advanced it strikes a slightly inclined plane that diverts its axis so that it assumes gradually a position at right angles to the instrument; its relation to the ends of the catheter-carrying device being such that the catheters are deflected to almost any angle desired, the tips of the catheters being, when properly advanced, always within the field of the lens.

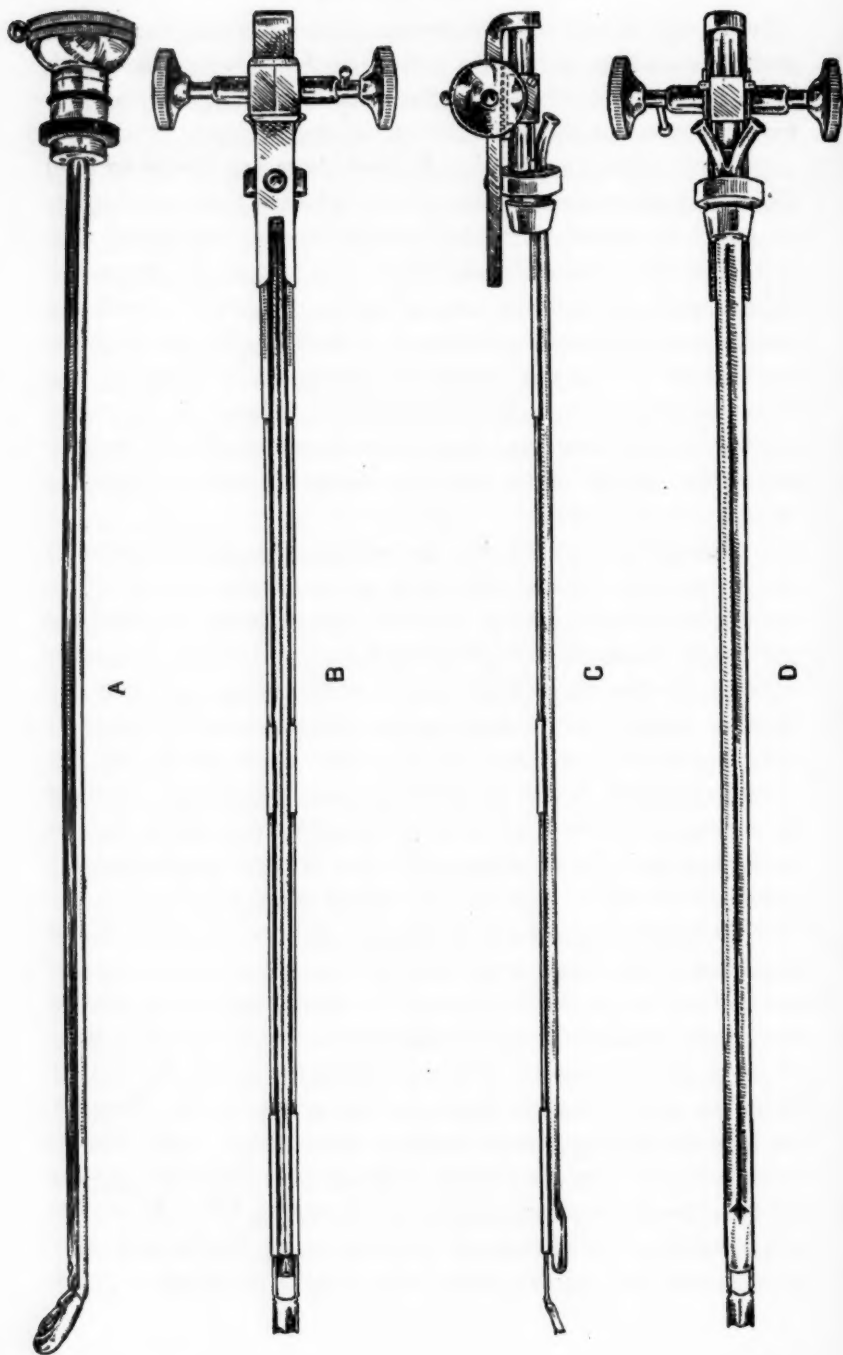
*Figure B* shows a view of the superior surface of the part of the instrument carrying the deflector and the catheter tubes; *Figure C*, a lateral view; and *Figure D*, the inferior

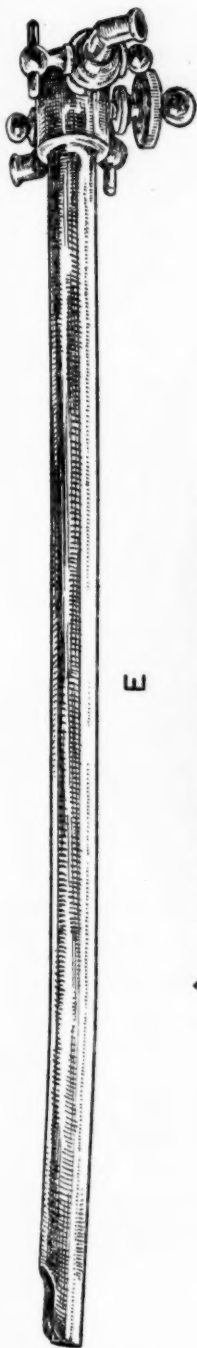
view of the same. This telescope and deflecting device are contained within a sheath shown in *Figure E*; the sheath is so constructed that when the beak containing the lamp is turned, as in the Bierhof instrument, the catheters projecting from their tubes lie horizontally and there is nothing to bind them or bend them in their course between the ureter openings and the tubes, so the instrument may be withdrawn with the slightest resistance and friction. *Figure E* shows the sheath with the deflector out of sight. *Figure F* shows the sheath and the relation of it to the deflector. *Figure G* shows the vesical end of the completed instrument; *Figure H*, the vesical end with the catheters deflected; *Figure I*, the external end of the completed instrument that contains the irrigating tubes and the wheel for controlling the deflector and the electrical connection.

The advantages of this instrument over those previously devised are: (1) that it may be properly sterilized after using; (2) that a relatively large catheter may be used; (3) that the deflecting device is so constructed that it cannot injure the urethra in the withdrawal of the instrument; (4) that the bladder may be irrigated while the catheters are in place; (5) that the opening of the sheath is so constructed that the catheter may lie flat in withdrawing the instrument and there is nothing to bind it as in other instruments, which may be better shown in the last figure (Fig. 1) illustrating the catheter entering the ureter and the instrument prepared for removal. The illustrations give a fair idea of the construction of this instrument and, after using it for a year, the writer is satisfied with it for use in the female—the original instrument causing too much traumatism on the male urethra to be useful in men.

About six months after the construction of this instrument for the writer, the same makers made for Dr. Buerger, of New York City, an instrument which shows some distinct improvements over the present cystoscope. The same opening in the sheath is retained and an obturator fitted to it that makes it easy of introduction in the male; the lamp is constructed as part of the sheath and is not connected with the



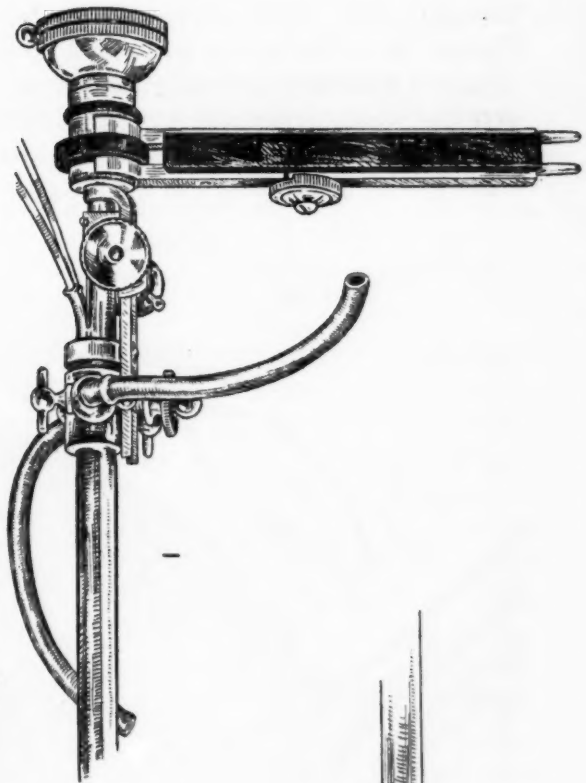




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F



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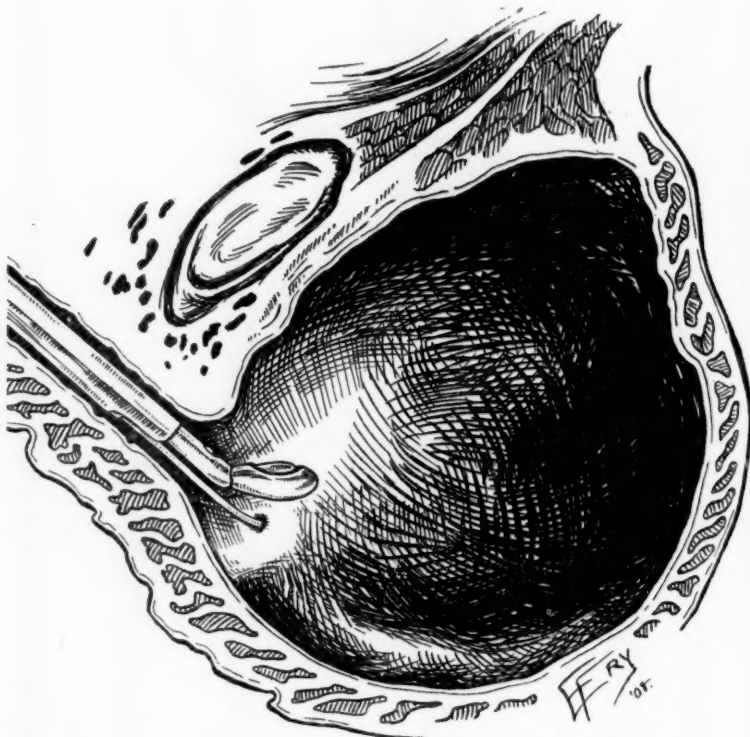
G



H

telescopic tube. Both instruments are made by the Wappler Electric Controller Company, of East 87th Street, New York City, and while the instrument of Buerger is an improvement over that of the writer, still it presents the disadvantage which the writer has tried to overcome in withdrawing the instrument, leaving the catheters in the ureters.

FIG. 1.



Showing the cystoscope in place, with the catheter in the ureter, preparatory to removal of the instruments leaving the catheter in place.

The writer presents this instrument fully realizing its defects, but he believes that it presents certain new principles in the construction of the cystoscope which will eventually lead to the production of a practical instrument that will encourage more surgeons to use the cystoscope in the diagnosis of diseases of the kidney and bladder.

## A NEW INDIRECT IRRIGATING OBSERVATION AND DOUBLE CATHETERIZING CYSTOSCOPE.

BY LEO BUERGER, M.D.,

OF NEW YORK,

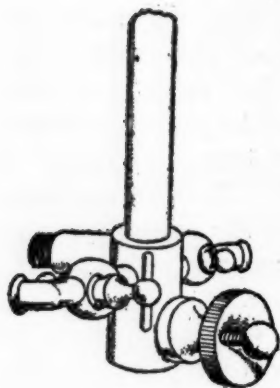
Assistant Adjunct Surgeon and Associate in Surgical Pathology, Mt. Sinai Hospital;  
Associate Surgeon, Mt. Moriah Hospital; Cystoscopist,  
West Side German Dispensary.

IN spite of the fact that a large number of modifications of the Nitze cystoscope have been offered to the genito-urinary surgeon during the past ten years, we still do not possess an ideal indirect vision instrument which will permit of irrigation while the process of double catheterization is going on. About nine months ago Dr. F. Tilden Brown designed an indirect vision telescope and catheter bed which could be attached to his "composite cystoscope" and which promised to fill this want. Working along similar lines, but adhering more strictly to the original type of the Nitze instrument, I have been able to develop an instrument in which the Brown sheath, with certain necessary changes, has been combined with the Otis telescope and the Albarran deflecting device, in such a manner as to overcome most of the objectionable features possessed by the older instruments.

The instrument consists of three parts, the sheath, the obturator and the catheterizing telescope. The sheath is circular on cross section, bears a very short lamp at its end, measures eight and one-quarter inches in length and possesses a large fenestra or window behind the lamp. Its calibre is 24 of the French scale (Figs. 2 and 3). Save for the lamp, which points toward the concavity of the instrument and the window, the sheath has much in common with that employed in Brown's direct vision cystoscope.

The obturator, which closes the working aperture, is perforated so as to allow irrigation even when it is in situ, through the two lateral faucets in the sheath.

FIG. 1.



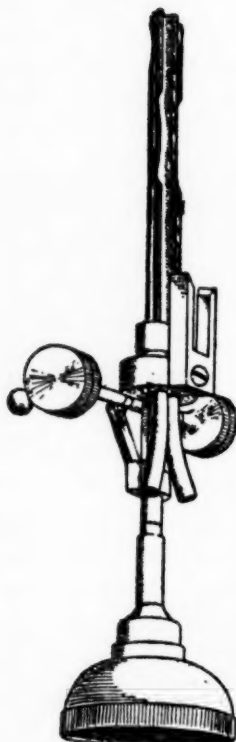
Sheath.

FIG. 1a.



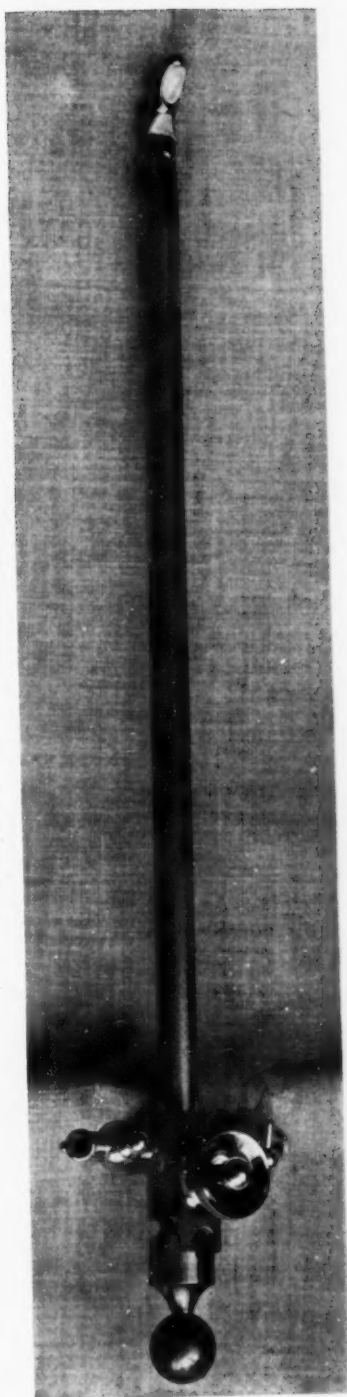
Obturator.

FIG. 1b.



Catheterizing telescope.

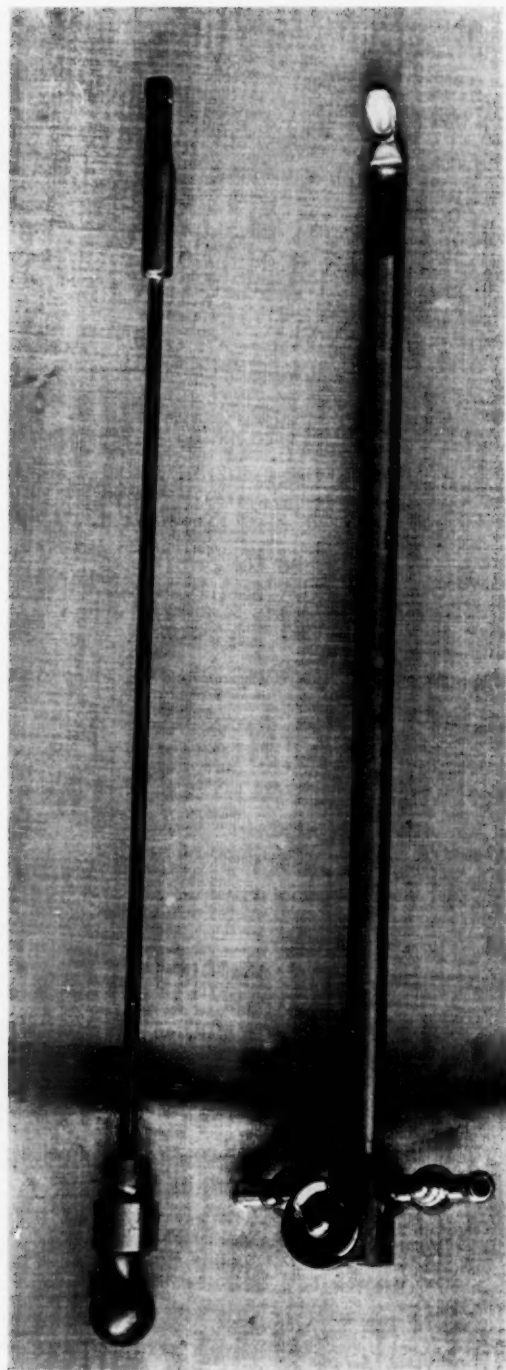
FIG. 2.



Cystoscope sheath with obturator in place.

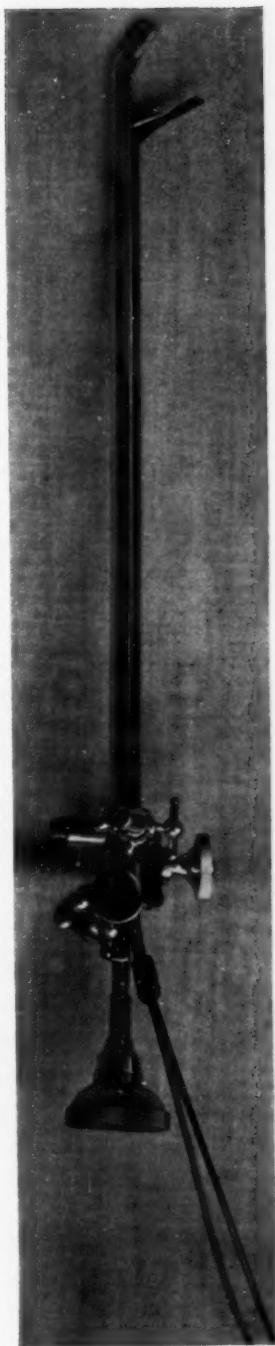


FIG. 3.

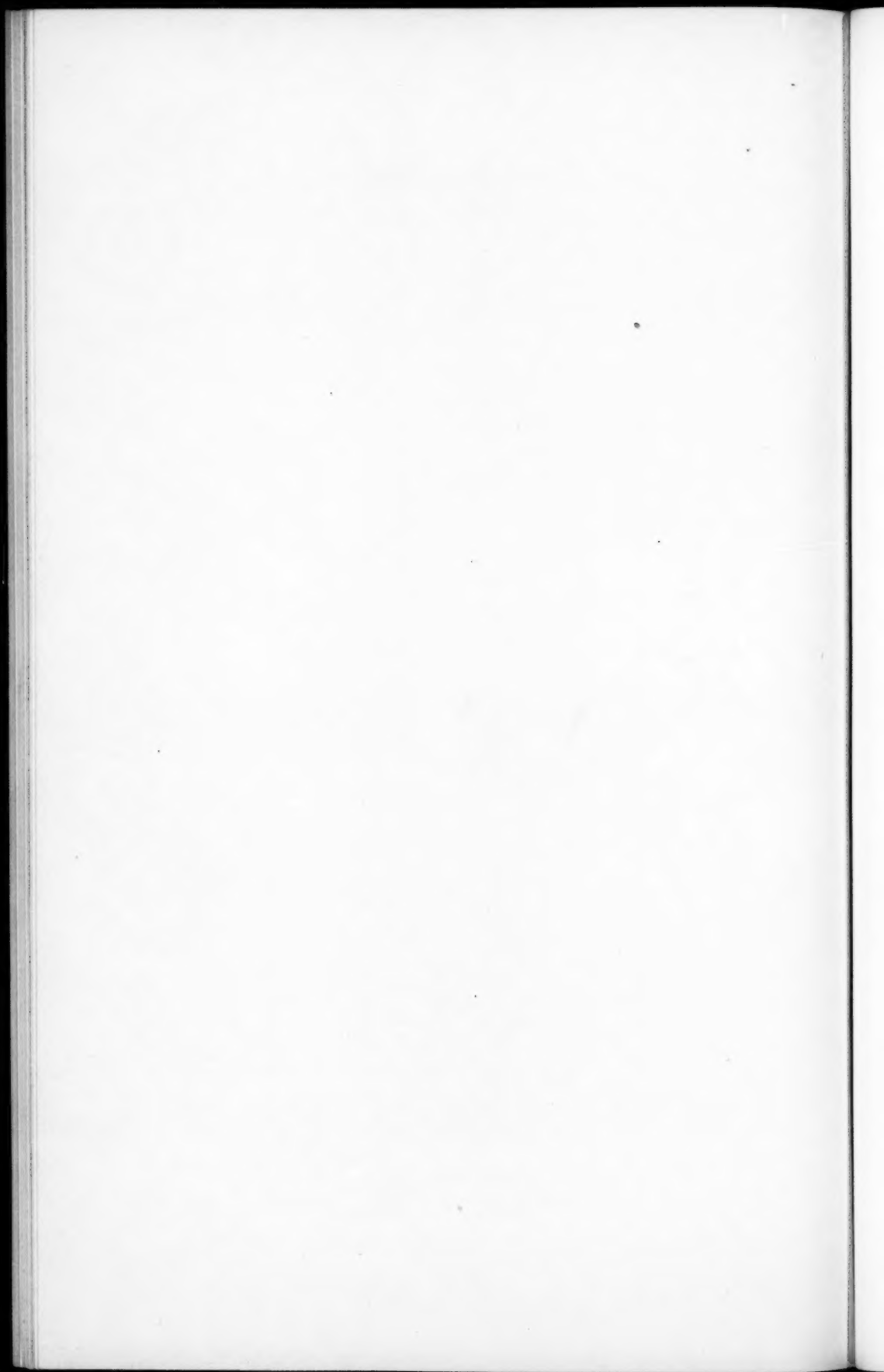


Cystoscope sheath and obturator.

FIG. 4.



Catheterizing telescope with catheters in place lies in the sheath; the deflector (or finger) is raised and catheters are deflected by it.



The catheterizing telescope combines in one piece the optical apparatus, the mechanism for deflection (Albarran) and the catheter grooves or beds. A glance at Fig. 1b will show that the telescope carries a double grooved bed upon its upper aspect. This is large enough to permit the lodgement of two number 7 French ureteral catheters. At the end near the lens this gives way to a closed ring in which the tips of both catheters are held secure. A large deflector or catheter-lift is implanted between the lens and the ring and hinges on a small wedge, which latter serves the double purpose of fulcrum and inclined plane for giving the catheters their primary deviation. All the parts are exposed so as to permit easy cleansing and easy repair.

FIG. 4a.



Catheterizing telescope in place.

The technic of its employment is as follows: The sheath with obturator in situ is introduced into the bladder; the obturator is then removed and the bladder irrigated through the open end of the sheath. After evacuation of the irrigating fluid the telescope with the two catheters in place is introduced. The bladder is now distended with the requisite amount of fluid through one of the two irrigating faucets. The catheterization of the ureters is effected in the same way as in the Nitzen-Albarran instrument.

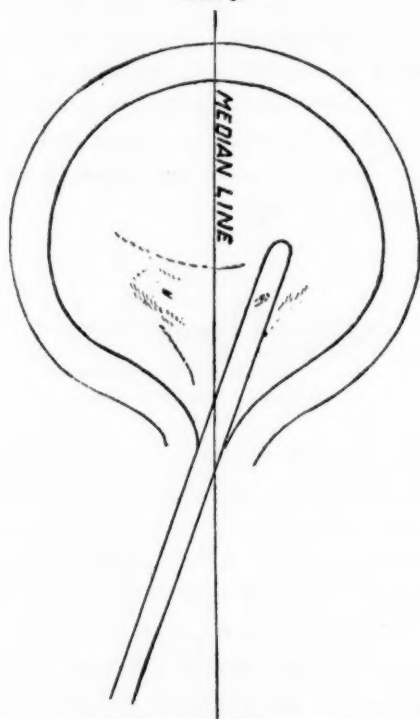
It may not be amiss to give the details of a procedure for catheterizing the ureters which varies somewhat from that which is usually laid down in the text-books, but which has given me the most satisfaction.

1. The ureteral opening is found and the ocular end of the cystoscope is brought slightly to the opposite side of the patient. By raising the shaft the ureteral slit is made to occupy a point just below the centre of the field. *This position must be rigidly maintained during the next two steps.* It is

best to get a picture of the ureter which is about the normal size; this is obtained when the objective is at a distance of 1 to  $1\frac{1}{8}$  inches (Figs. 5, 6 and 7).

2. After the deflector has been slightly raised (just sufficient to prevent the catheter from hugging the lens) the

FIG. 5.



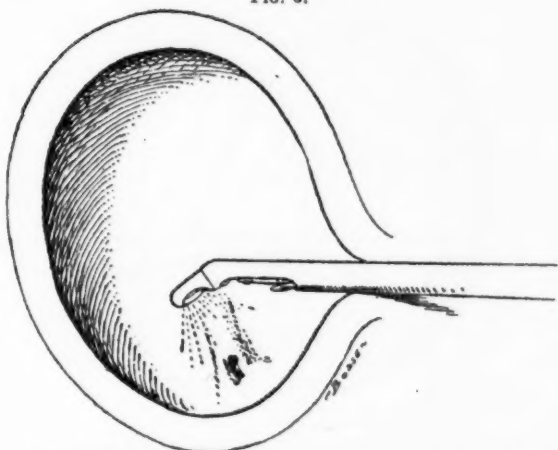
Position of cystoscope in normal ureteral catheterization.

catheter is pushed forward about 1 to 1.5 centimetres beyond the limit of the field. Now the catheter appears enlarged, for it lies close to the prism (Figs. 8, 9 and 10).

3. The deviation is gradually increased by raising the deflector, the movement of the catheter in the field being observed during this procedure. The tip of the catheter now comes into view, first appearing at the bottom of the field and gradually travelling upward, its size diminishing at the same

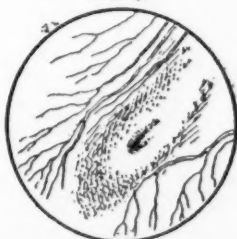
time. When its tip is a short distance above<sup>1</sup> the ureter, it is usually in the proper position; in reality it then lies in front (nearer the neck of the bladder), above, and slightly to the inner side of the ureteral mouth (Figs. 11 and 12).

FIG. 6.



Normal ureteral catheterization: first move; cystoscope in normal position.

FIG. 7.



Cystoscopic view: we see the ureter somewhat below the centre of the field; view seen in Fig. 6.

4. By now raising the shaft of the instrument, and at the same time passing it further into the bladder, the tip of the catheter is made to enter the mouth of the ureter.<sup>2</sup> There-

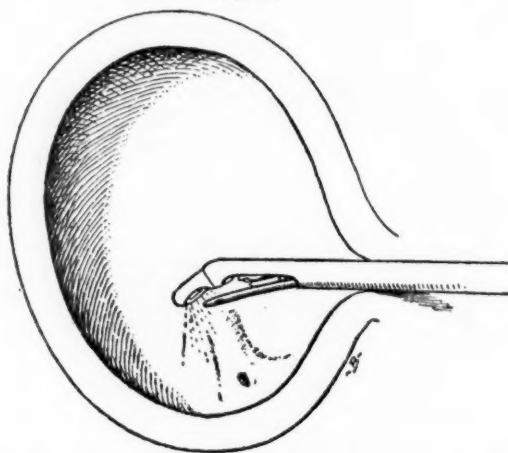
<sup>1</sup> Apparently "above"—that is, "above" in the field; or, if we wish to regard it so, "behind" in the field.

<sup>2</sup> We must remember that when we raise the ocular, the ureter seems to travel down the field; when we push the instrument further into the bladder, the ureter goes up the field. Hence the degree motion of the cystoscope into the bladder must exceed the lifting of the shaft in order to make the ureter meet the tip of the catheter.



fore the cystoscope and catheter as a whole travel towards the opening and not the catheter alone (Figs. 13 and 14). In the picture we see the ureter ascend to meet the catheter

FIG. 8.



Normal ureteral catheterization: second move; the tip of the catheter lies beyond the field.

FIG. 9.

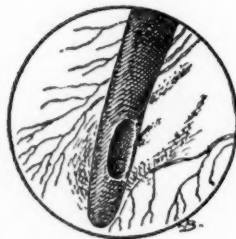


FIG. 10.

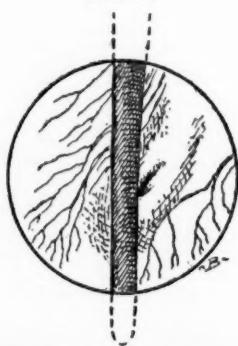


FIG. 9.—Cystoscopic view: the catheter is being pushed across the field.

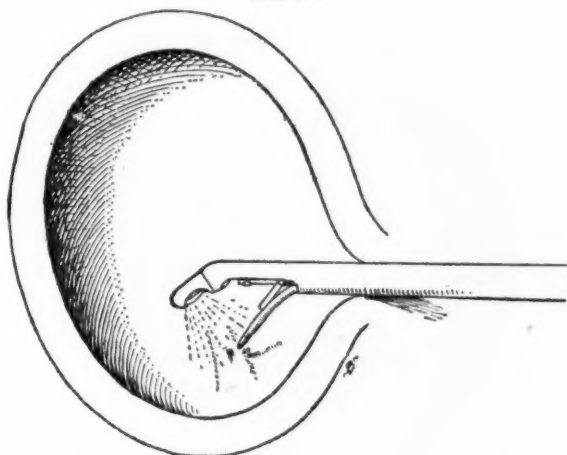
FIG. 10.—Cystoscopic view: the catheter lies beyond the field; view seen in Fig. 8.

at about the middle of the field. When the catheter has engaged the ureteral opening it is pushed a short distance forward, the deflector is depressed somewhat, and, by still further raising the ocular, the introduction of the catheter becomes easy.

The lid (deflector) is now turned down, the other ureter sought, and the same method employed.

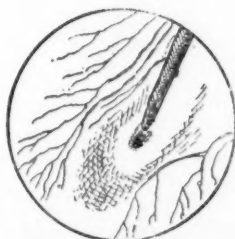
After a little practice we learn just how far to push the catheter before giving it the complete deviation.<sup>3</sup> The amount

FIG. 11.



Normal ureteral catheterization: third move; the catheter has received its full inclination.

FIG. 12.



Cystoscopic view: the catheter tip lies just above the ureteral opening; view seen in Fig. 11.

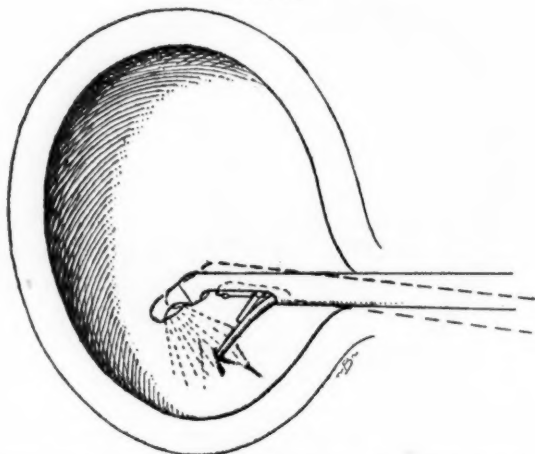
of unsheathed or exposed catheter must be such that the catheter tip projects about 1 to 2 centimetres beyond the level

<sup>3</sup> The primary deviation must be very slight, just enough to prevent the catheter hugging the lens. Of course if the catheter be deflected too much at the start, then a much greater portion can be pushed out before it reaches the periphery of the field. In using the Nitze instrument I usually make the catheter pass 1 to 1.5 centimetres beyond the field (no primary deviation having been given), then deflect it as described.

of the tip of the lamp. This leaves sufficient room for the instrument to travel, and the chances of contact between lamp and bladder wall are very slight.

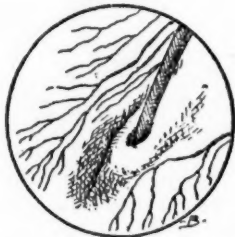
Although this may be considered as a normal method, certain variations in technic will be required in difficult or

FIG. 13.



Normal ureteral catheterization: fourth move; by the forward motion of the instrument and the ascent of the ocular, the tip of the catheter is made to enter the ureter.

FIG. 14.



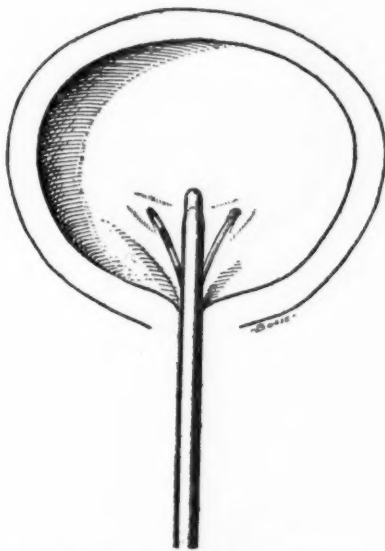
Cystoscopic view; catheter has entered; view in position [Fig. 13].

anomalous cases. Thus, we may find it advantageous to change the amount of deflection; or to retain the maximum deviation while pushing the catheter along the ureteral canal. If we see that the bladder wall is being raised considerably by the entering catheter, we know that the anterior wall of the ureter is being lifted up by the catheter. This occurs es-

M 70 U

pecially when stiff catheters are used and when the deflector has been turned down too far. For in both instances the catheter has a tendency to seek a higher level, one approaching the plane of the shaft of the instrument. To overcome this, three manœuvres are permissible, either raising the ocular so as to bring the ureters more nearly in the direction of the ureteral canal, or increasing the deflection, or a combination of both.

FIG. 15.



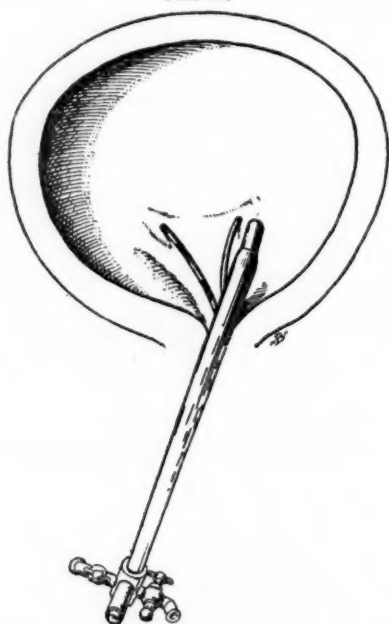
Removal of sheath: first position; the telescope has been removed; the catheters lie loose in the sheath.

If carefully carried out this procedure is far superior to that by which the catheter is "aimed" at the opening and pushed out to meet it. It affords a more certain way of hitting the mark, avoiding scraping of the bottom of the bladder, and, with the long deflector provided in the new instrument, is extremely easy of execution.

The catheter-bearing telescope and sheath have been so proportioned that even when two number 7 French ureteral catheters are being used, sufficient space is left to allow irrigation of the bladder during the process of catheterization.

The following manipulations will enable us to remove the instrument with ease, leaving the catheters in the ureters. After having introduced the catheters a little higher than we would if the instrument were to remain in the bladder, and after removal of the telescope, the following movements should be carried out: first, the ocular is depressed and carried a lit-

FIG. 16.



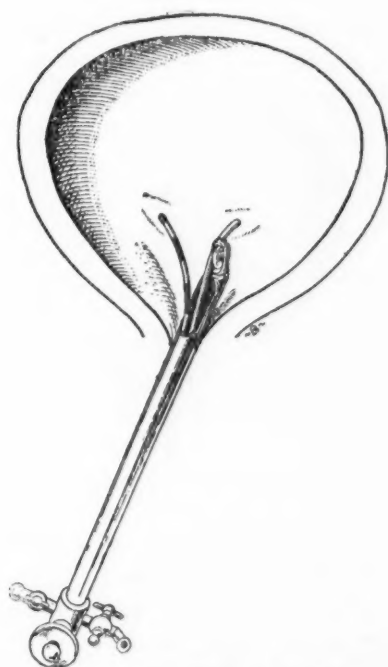
Removal of sheath: second position; with depressed ocular; the beak and catheters are disengaged.

tle to the left, thus separating the beak from the line of the catheters (Figs. 15 and 16); second, the whole instrument is rotated to the right on its longitudinal axis through an arc of 180 degrees, retaining the relative position just described, thus making the beak point upward (Fig. 17); third (still in the same plane, with the ocular a little to the left), the ocular is raised and brought back to the median line in order to bring the convexity of the beak against the trigone of the bladder (Fig. 18); and fourth, the sheath is removed, its

inferior aspect being made to hug the posterior wall of the urethra.

Should we desire to use the cystoscope for observation only, a telescope giving an extraordinarily large field can be inserted instead of the catheterizing apparatus. A retrograde-vision telescope or a small telescope with operating instruments may be also substituted.

FIG. 17.



Removal of sheath: third position; the beak is turned up.

Some of the special features may deserve mention before we sum up the advantages of this instrument. First, the small size of the lamp diminishes the likelihood of contact between lamp and bladder wall.<sup>4</sup> Second, the distance between the distal end of the filament (which point corresponds

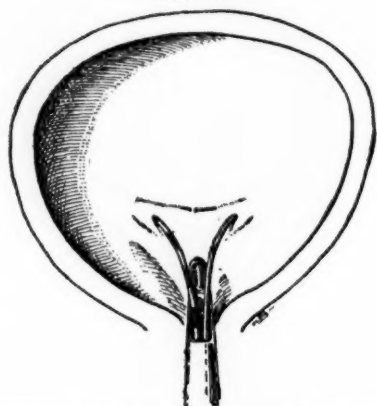
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<sup>4</sup>If we desire to use the instrument for observation alone a larger lamp may be screwed on; this is not essential.



to the brightest part of field) and the centre of the objective lens has been reduced as much as possible in order to attain the maximum illumination for any given sized lamp. Dr. F. T. Brown had already suggested this improvement for the Otis observation cystoscope. Third, the large size of the deflector gives firm support to the catheters. Fourth, the relative positions of the lens, deflector and margin of the window are such that catheterization is easy, the catheters always remaining in the field when properly deflected; and fifth, no difficulty

FIG. 18.



Removal of sheath: the sheath is being removed.

is encountered in deflecting the second catheter even when number 7 French catheters are employed.

The advantages of the combined indirect irrigating observation, double catheterizing and operating cystoscope over others of its type may be summed up as follows:

1. The employment of a catheter for washing out the bladder is not necessary, the sheath serving this purpose.

2. Because of its small calibre (24 French),<sup>5</sup> its round shape, and its smoothness in the region of beak and window, the introduction of the instrument is easy and injury to the deep urethra is avoided.

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<sup>5</sup>If we are satisfied with the use of two No. 5 or 6 French ureteral catheters, the instrument can be constructed so that its calibre is 22 French.

3. It carries larger catheters than any other indirect vision cystoscope, although its diameter is smaller. Two number 7 French catheters pass with ease.

4. The telescope and sheath may be removed, leaving the catheters in the ureters.

5. Irrigation of the bladder may be very rapidly effected by removing the whole catheter-bearing telescope or by washing through the faucets in the sheath. This may be continued whilst the process of catheterization is going on.

6. By the employment of the grooved beds the catheters are separated in such a manner that friction between them is impossible; a new catheter can be inserted at any time without removing the telescope. This was borrowed from the improved Brown instrument.

7. The proximity of lamp and objective lens gives the best illumination for catheterizing purposes.

8. The small size of the lamp makes the chances of contact with the bladder wall small.

9. Inasmuch as the catheter-bearing mechanism is separable from the sheath and is not introduced until the bladder is clean, *the likelihood of carrying infection into the ureters is reduced to a minimum.*

10. A large telescope for indirect or retrograde vision may be used in the same sheath.

11. A small telescope will leave ample room for the introducing of operating instruments of various kinds.

12. The addition of a correcting prism to the ocular produces an upright picture and enhances the brilliancy of illumination<sup>6</sup> (orthocystoscopy).

It gives me great pleasure to acknowledge my indebtedness to Dr. Abraham Wolbarst, Chief of the Genito-urinary Clinic at the West Side German Dispensary, for his kindness in having placed much of his large clinical material at my disposal; and further I wish to thank Dr. F. Tilden Brown for his kindly interest and encouragement.

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<sup>6</sup>The instrument was constructed for me by the Wappler Electric Controller Co. with the efficient aid of Mr. R. Wappler.

## COMPLETE DENUATION OF THE PENIS.

BY CHARLES A. POWERS, M.D.,

OF DENVER, COLO.

ON the afternoon of November 17, 1907, F., a lad of six years, while escaping from an angry farmer, hastily climbed through or over a barbed-wire fence. He tore his clothes, sustained some scratches and on arriving home found that he had injured his penis. He was not seen by a physician until the following morning when Dr. P. V. Carlin attended him, sent him to St. Joseph's Hospital in Denver and kindly asked me to see him.

Upon examination it was found that the skin at the base of the penis, just at its junction with the body, had been divided through its entire circumference and to the deep fascia as cleanly as though with a knife, this division including a little of the scrotum. The skin of the penis had then been completely everted, stripped off and down so that it was hanging as an inverted tube at its preputial attachment. The condition is shown in Fig. 1: the skin was, however, hanging at its mucocutaneous junction rather than at the site of the corona as shown in the picture. The artery of the frænum could be plainly felt. The boy had been urinating through this inverted tube, which, as said, had been peeled off much as one would invert the finger of a glove in removing it.

The vitality of this inverted skin seemed questionable, at its cut end it tended to slough. Under ether the parts were well cleansed, the questionable tissue cut away, and the inverted skin tube replaced on the penis. The abdominal and scrotal skin were dissected up a little and the edges approximated by interrupted horse-hair sutures.

About one-fifth of the skin at the base of the penis sloughed, this sloughing being rather greater on the left side than on the right. This condition is shown in Fig. 2, a sketch made from life on the eighth day. The parts closed in easily and promptly by granulation and at the end of four weeks healing was complete. The foreskin gradually retracted over the glans. At the end of

FIG. 1.

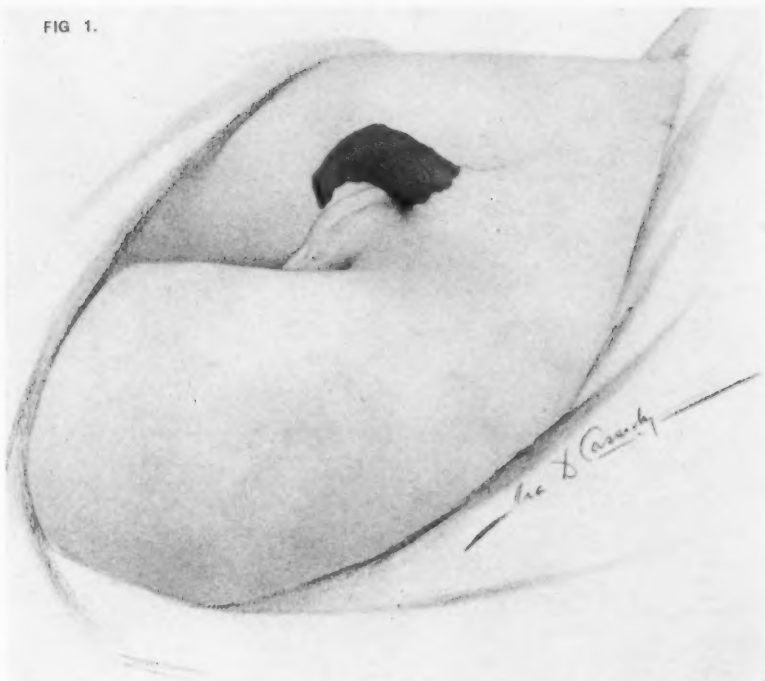


FIG. 2.

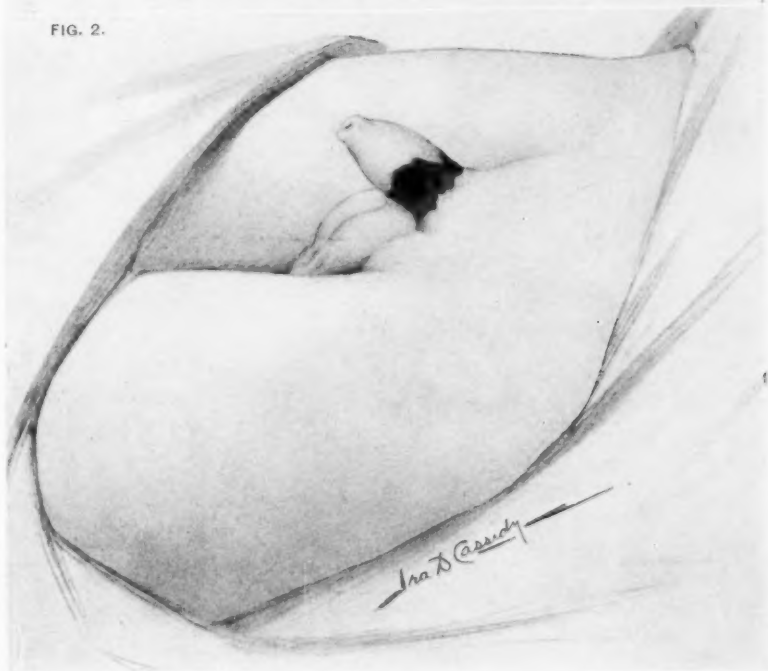


FIG. 1.—Complete denudation of the penis. Condition eighteen hours after the accident.  
FIG. 2.—Complete denudation of the penis. Condition on the eighth day.

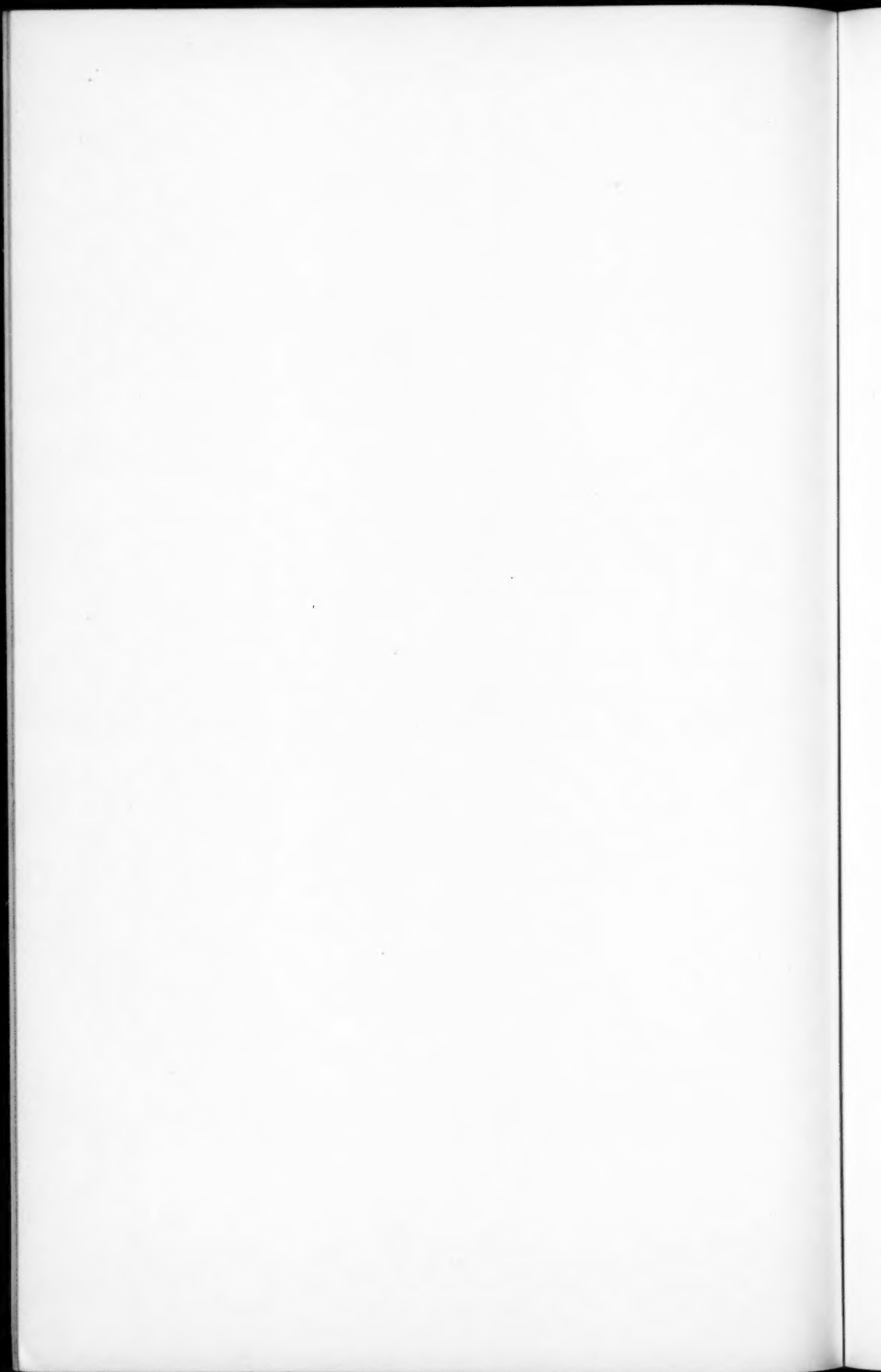


FIG 3



Complete denudation of the penis.—Condition at the end of eight weeks.





the eighth week the condition resembled that following ordinary circumcision. Fig. 3 shows a sketch made at this time. There was no constriction at the base of the penis, the skin was fairly movable.

At this time, one year after the accident, the boy notices no inconvenience. According to his account, carefully gained, urination and erections are normal. There is no cicatricial constriction.

## THE OPERATIVE TECHNIC OF CARCINOMA OF THE PENIS.

BY JAMES H. NICOLL, M.B.,

OF GLASGOW,

Professor of Surgery in Anderson's College; Surgeon to the Western Infirmary.

DURING the past fourteen years I have employed the following method of operating for removal of penile carcinoma. In November, 1905, in describing it to the Glasgow Pathological and Clinical Society (vide *Glasgow Medical Journal*, May, 1906), I made reference to the results in cases treated which had passed the three year period, and to two cases which had not. Of these two cases, one (patient sent by Dr. John MacIntyre), in which there was extensive involvement of the deep inguinal glands, had fatal recurrence in the region of these glands within a year; the other (sent by Dr. Jas. Stevenson), in which the disease was in less advanced stage, is free from recurrence three and a half years after operation. During the past three years I have not seen a case of penile carcinoma, but within the past three months have operated on two in the Western Infirmary of Glasgow. The same method has been employed as in former cases. Its object is the removal, *en masse*, of the primary carcinoma, the fat and glands of the groins, and the lymphatic vessels intervening between primary growth and area of probable or actual secondary extension. This is, of course, the object of all modern operations for carcinoma wherever occurring.

In the penis, carcinoma is practically always an epithelioma originating on the surface of glans or prepuce, usually in the region of the corona.

The lymphatics of the anterior half of the penis pass almost wholly to the dorsum, the main channels passing back on either side of the dorsal vein to the oblique set of superficial glands of the groin, in the first instance, secondarily

thence to the deep inguinal glands lying along the external inguinal vessels on the brim of the pelvis. Few, if any, of the lymphatics from the anterior half of the penis pass to the deep lymphatic vessels of the root of the penis, which channels pass under the pubic arch to the intrapelvic glands.

Epithelioma of the penis (prepuce and glans) like chancre in the same region, primarily extends along the dorsal lymphatic channels on either side of the dorsal blood-vessels and affects the glands of the groin and the deep inguinal glands along the brim of the pelvis. Only late in the progress of the disease does the growth infiltrate the corpora cavernosa and the posterior portion of the corpus spongiosum, and thus reach the lymphatics which are under the pubic arch, and, through these, the intrapelvic glands. When such infiltration of the proximal portion of the penis and invasion of the intrapelvic glands have occurred the case is inoperable in the vast majority of instances. For such advanced cases various extensive operations, including the bisection of the scrotum and the detaching of the crura penis from the pubic arch, have been introduced, and may possibly be justifiable in a few cases.

The usual, operable, case of penile carcinoma presents a growth in the anterior fourth or third of the penis, with possible extension along the dorsal lymphatics and involvement of the superficial glands of the groin, and, through them, the deep inguinal glands along the external iliac vessels. There is no infiltration of the posterior part of the penis, nor are the lymphatics under the pubic arch infected. Operative measures should aim at the removal of the anterior two-thirds or three-fourths of the penis, plus the dorsal blood- and lymphatic-vessels (with their surrounding connective tissue) back to the pubes, and *plus*, further, the fat (and contained lymphatic-glands and channels) of both groins. All the structures mentioned should be removed in one mass. In cases in which glandular involvement has extended under Poupart's ligament from the superficial inguinal to the deep inguinal glands, these latter must also be removed.

The entire operation is carried out through a Y-shaped

incision,—strictly a Y-shaped incision. The steps in its execution are as follows:

1. Having passed a sound, make the incision indicated in Fig. 1. The “arms” of the Y extend along the folds of the groin—or along a line more or less parallel with that fold but somewhat above it—from a point at the root of the penis on the pubic crest outwards towards the superior iliac spine. The “leg” of the Y, carried along the dorsum of the proximal fourth of the penis, terminates in the loop which constitutes the “foot” of the Y, which loop obliquely encircles the penis. That loop is skin-deep only, the “leg” is carried more deeply, and the “arms” are ultimately deep wounds (see Fig. 1).

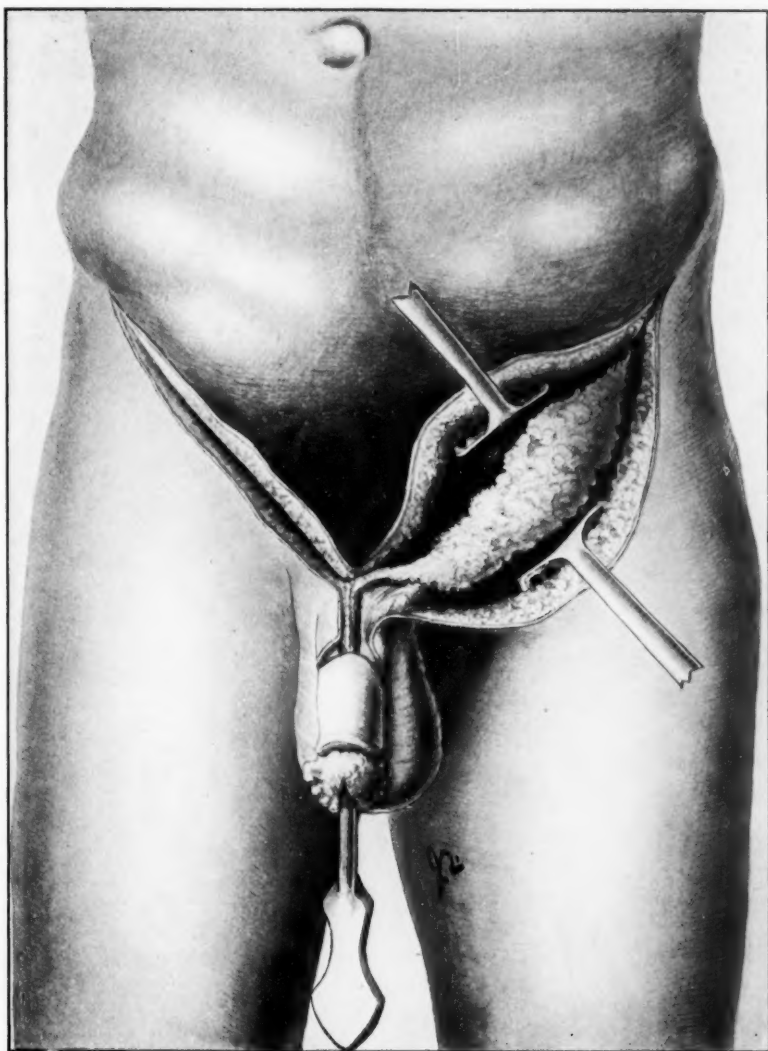
2. Dissect out all fat and contained lymphatic channels and glands, *en masse*, from both groins. Hemorrhage may be largely avoided by reflecting the lower skin flaps first, towards the thighs, thus securing at once the superficial epigastric, superficial circumflex and external pudic arteries and veins where they perforate the deep fascia. These vessels once secured, the upper flaps are reflected and the whole fat of the groins rapidly raised *en masse* from the deep fascia lata of the groins and the aponeuroses of the external oblique muscles.

In cases in which the step is indicated, next open the fascia lata just below Poupart's ligament, and, having exposed and opened the femoral sheath, and raised and repressed the peritoneum, remove the fat and glands along the external iliac vessels, pushing aside or tying the deep epigastric vessels.

3. Dissect out the dorsal blood-vessels and lymphatic channels of the penis (with all surrounding fascia) leaving the sheaths of the corpora cavernosa bare on their dorsal aspect. Tie the dorsal arteries and vein close to the pubes at the suspensory ligament of the penis. The fat of the groins, and the fascia and vessels of the dorsum of the penis form one continuous mass containing the unbroken lymphatic channels.

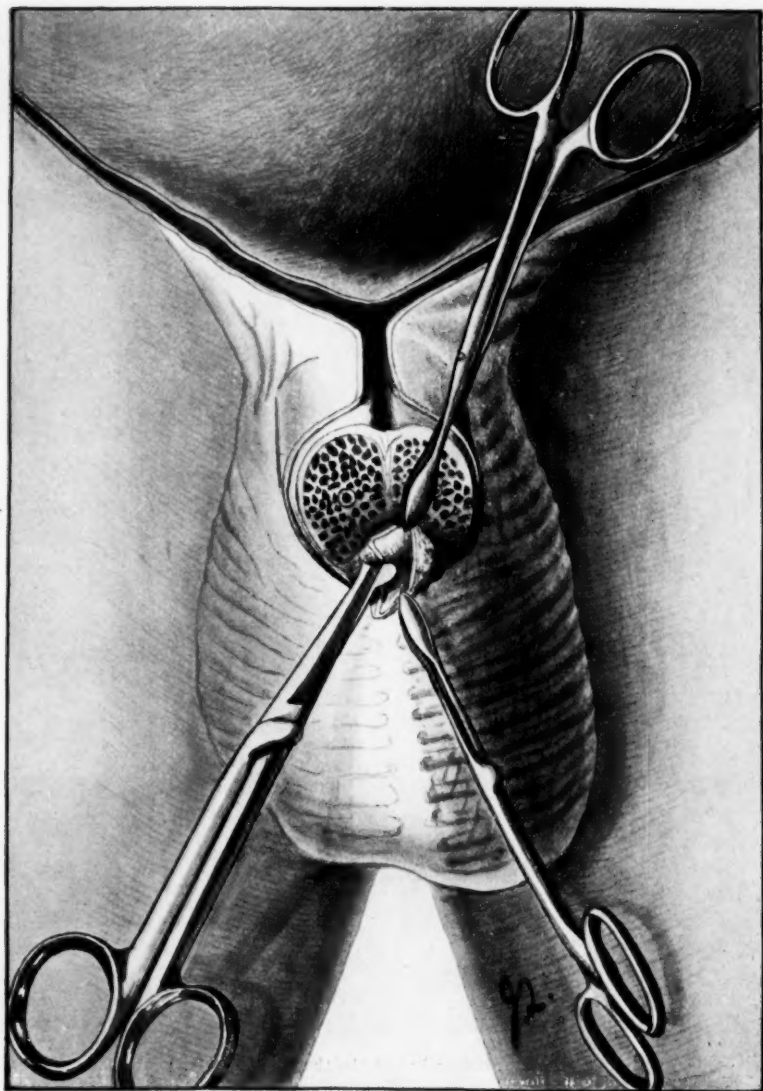
4. At the line of the loop-incision round the penis, pass the knife between the corpus spongiosum and the two corpora cavernosa, and divide the latter.

FIG. 1.



Y  
O incision. The "O" loop obliquely encircles the penis, and is merely skin-deep. The "leg" extends along the dorsum of the penis. Through it the dorsal lymphatics are dissected out *en masse* with the dorsal blood-vessels and surrounding areolar tissue. The "arms" extend along the folds of the groins. They constitute deep wounds, through which are removed all the superficial inguinal glands and surrounding fat, and through which, also, are removed any deep inguinal glands found on exploration of the retroperitoneal fat around the iliac blood-vessels on the brim of the pelvis.

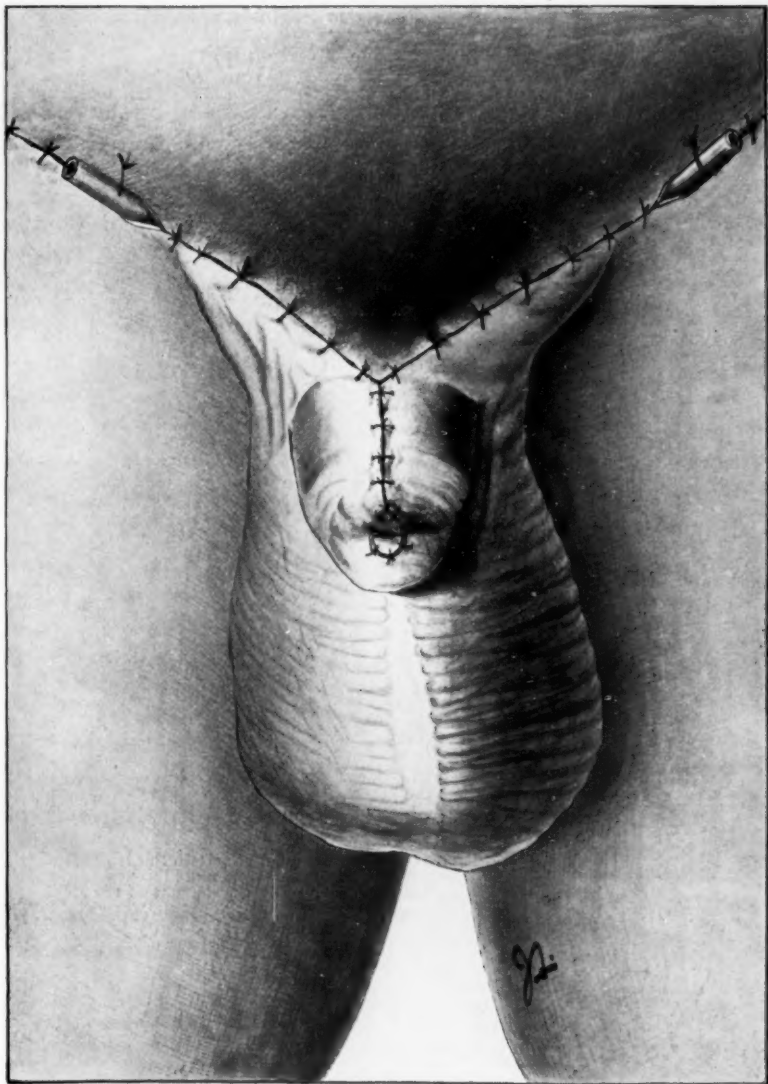
FIG. 2.



Penis removed. The corpus spongiosum is left longer than the corpora cavernosa, and is cut obliquely to leave the lower lip longer than the upper. The urethra and surrounding corpus spongiosum are shown in process of being split transversely.



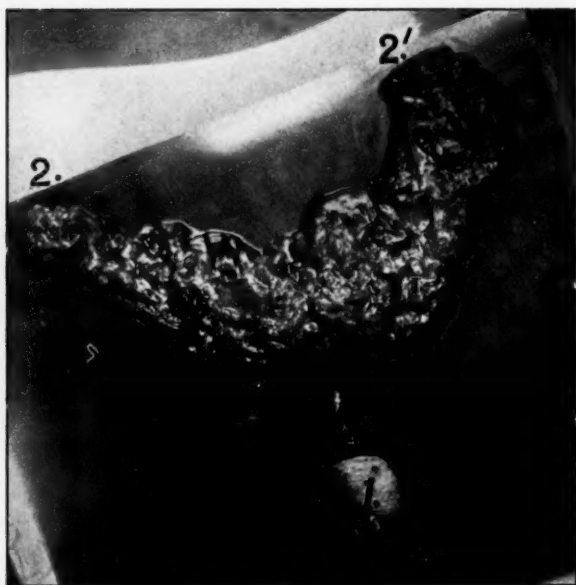
FIG. 3.



Wound sutured, showing the long spout-like inferior lip of the urethral orifice, and the drainage tubes necessary to provide for the lymphorrhoea which follows the extensive removal of the lymphatics of the groin.

NOTE.—In practice the portion of the penis left is shorter than is indicated in the illustration.

FIG. 4.



Photograph showing parts removed: 1, anterior two-thirds of penis; 2 and 2', fat and contained glands of groins united to penis by the vessels, lymphatics, and fibrous tissue of the dorsum of the penis.

5. Withdraw the bougie, and divide the corpus spongiosum. This should be done at a point somewhat anterior to the line of division of the corpora cavernosa, thus leaving the spongy body and divided urethra rather longer than the cavernous bodies. Further, it should be done obliquely, to leave the inferior lip of the divided urethra longer than the superior (Fig. 2).

6. Split the urethra and spongy body transversely to the extent of one-third of an inch (Fig. 2).

7. Secure the arteries of the corpora cavernosa, and the arteries of the corpus spongiosum. No tourniquet is possible in the operation, and these vessels will have been temporarily clamped by pressure forceps on division of the penis. In the application of the forceps time and blood are saved by clamping each vessel *en masse* with some of the surrounding cavernous tissue. Similarly the ligature should include all that is held in the forceps. The penile tissue is occasionally so friable that attempts to isolate these vessels fail. Where hemorrhage proves difficult to control by ligature (a rare event) it may be checked by encircling the cavernous body by a suture having a "bite" in the tough penile sheath. Preliminary ligature of the internal pudics is unnecessary.

8. Close the wound by suture as indicated in Fig. 3. The oblique direction of the skin incision encircling the penis, the fact that the spongy body is cut longer than the cavernous bodies, and the oblique division of the urethra itself all combine, when the wound is sutured, to the shaping of a meatal orifice with a "spout-like" inferior lip, a matter of prime importance in the subsequent comfort of the patient in micturition.

9. Drainage is necessary (Fig. 3). One effect of the wholesale clearing of the fat and lymphatics from the groin is a lymphorrhœa through the groin-wounds. This is usually sufficient to "bag" the wounds if undrained, and may be excessive, necessitating change of dressings several times daily. Such lymphorrhœa is unknown in the axilla after operation for mammary carcinoma.

10. A soft catheter is fixed in the urethra by sutures for several days—or regular catheterization is carried out for the same period. Thereafter the patient is permitted to pass urine.

11. The method of dressing is of somewhat special importance. The wound is dressed in two parts: (a) the groins—the very free clearing out of the fat from the groins leaves the skin extensively undermined. As the patient lies in bed he naturally partly flexes his thighs. This brings the loose skin away from the subjacent parts, suspending it so far in mid air. To keep it in contact with the deeper tissues it is necessary to put in each groin a considerable mass of dressing. These masses are secured by a double spica bandage. (b) The penile stump is merely covered with a small guard of gauze, wrung from boracic or other bland fluid, and frequently renewed. This is secured by a couple of catch pins to the spica bandage.

## CARBOLIC ACID GANGRENE OF FINGER.

BY JAMES A. KELLY, M.D.,

OF PHILADELPHIA,

Visiting Surgeon, St. Mary's Hospital; Pathologist and Instructor in Surgery, Philadelphia Polyclinic Hospital and College.

CONSIDERING the general use of carbolic acid in surgical antiseptics and its sale at drug stores without a prescription in solutions of all strengths, it is a remarkable fact that there are not more cases of gangrene seen following its indiscriminate use. Those cases which are found are doubtless due to ignorance on the part of the laity in the use of weak and even moderately strong solutions, and on the part of the profession to gross carelessness. I wish to report the following case as an instance of the former practice. This case was observed in the surgical out-patient department of the Polyclinic Hospital, in the clinic of Dr. Francis T. Stewart, to whom I am indebted for permission in reporting this case.

E. W., a woman 27 years old, married. Polyclinic Hospital, Out-patient Department; on records No. 23777; clinic of Dr. F. T. Stewart. Patient's family and previous history negative as far as they could have any bearing on the condition reported. First observed Feb. 24, 1908. The patient stated that on Feb. 21, 1908, she punctured her index finger with a small splinter of wood, which was removed immediately. The following day the finger began to swell so that last evening, Feb. 23, 1908, she applied to the finger a cloth saturated with a weak solution of carbolic acid of unknown strength, which she had obtained at a drug store. This dressing remained in place from 11 P.M. until 4 A.M. the next morning. It was removed on account of the pain in the finger. The dressing had become dry. She then noticed that the finger was numb, cold, discolored and dry, and at the base of the finger there was a distinct line of demarcation, and at this region there was intense pain present. When first seen by the writer the finger presented the following conditions: the terminal half of the left index finger was bluish white in color, which

extended on the flexor surface to the middle of the proximal phalanx, and on the extensor surface to the first interphalangeal joint. At the tip of the finger there is a blister containing serum, slightly blood-tinged. The skin over this blister is yellowish-blue. To the proximal side of the line of demarcation, the finger is swollen, red, very tense, and painful on pressure. This redness gradually fades to the normal color of the skin as the base of the finger is reached. Complete, superficial, and deep anæsthesia of the involved portion of the finger is present. On puncture with a needle in the involved area the tissue of the finger is found to be dry excepting in the region of the blister above mentioned. The patient was advised to have the finger amputated, but refused. A dressing of boric acid ointment was then applied with the understanding that the patient would return in two days for amputation if the condition had not improved. The patient failed to return to the clinic, but went to another hospital two days later and then the finger was amputated at the metatarsophalangeal joint.

Figs. 1 and 2 show the flexor and extensor aspect of the involved finger.

That the condition is not a rare one may readily be seen from the reported cases in the literature. Honsell in 1897 reported 48 cases; Von Bergmann states that in 61 cases collected, the strength of the solution used was 1 to 5 per cent. in 30 cases, and concentrated in 31 cases; Kortüm reports that he has observed gangrene following the use of moderately concentrated solutions of carbolic acid, in three to four hours; Von Bruns and Peraire report cases in which gangrene followed the use of a 1 per cent. solution for 24 hours; and Levai cites cases in which a 2 per cent. solution applied for 12 hours produced gangrene.

Kortüm regards the cause as neuropathic. Frankenberg states that "the epidermis is destroyed; the submucous tissue shows considerable transudation, and the contents of the lymph- and blood-vessels are coagulated. Gangrene follows the thrombosis of the vessels."

Levai and Honsell made a series of experiments and arrived at the conclusion that "it is very probable that the

FIG. 1.



Carbolie acid gangrene of finger. Flexor surface of hand.





FIG. 2.



Carbolie acid gangrene of finger. Extensor surface of hand.



action of carbolic acid is not a specific one, but is analogous to that produced by mineral acids."

Von Bergmann states, "Individual disposition probably plays a certain part, as I remember in my experience, during the period when carbolic acid was still used in the treatment of wounds; and a difference in toleration was noticed."

The author is inclined to consider that in the use of weak solutions of carbolic acid there is not a primary destruction of the epidermis, as Frankenberger states, but that the primary changes are of a neuropathic character; this is followed by a slowing of the blood current in the part affected, with transudation of the elements of the blood, and that, following the blocking of the blood and lymphatic system, coagulation takes place as a specific result of the action of the carbolic acid, which necessarily becomes stronger in character as the watery elements of the solution disappear through evaporation.

In the treatment of this condition one should not hastily advise amputation. Very often only a superficial necrosis of the part is produced, and by conservative treatment the part may be saved, and the necrosed area covered by skin-grafting. When the part has become dry, and bluish-black in color, and it is evident that complete gangrene has taken place in the part, then, and only then, should amputation or exarticulation be performed above the line of demarcation.

# TRANSACTIONS

OF THE

## NEW YORK SURGICAL SOCIETY.

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*Stated Meeting, November 11, 1908.*

The President, DR. JOSEPH A. BLAKE, in the Chair.

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### ACUTE HEMORRHAGIC PANCREATITIS.

DR. JOHN F. ERDMANN presented a woman, 22 years old, who, when she was first seen by Dr. Erdmann, on August 13, 1907, gave the following history: On June 13 she had a pain in her abdomen, and for some time previous to that date she had suffered from "spoiled stomach." The pain in the abdomen was typical of gall-stones, the pain continuing for a few days, and was accompanied by vomiting. Between June 13 and August 13, 1907, she had a number of similar attacks, and in one of them she became markedly jaundiced. On the 12th of August she had a sharp abdominal pain, intense and back-splitting, which immense doses of morphine failed to relieve.

When the patient was brought to the sanitarium, she presented more or less evidence of shock, with rise of temperature and rapid pulse, and intense pain in the epigastric region; this extended laterally into the back and also to the area of the gall-bladder. A probable diagnosis of acute hemorrhagic pancreatitis was made. A suggestion to open the abdomen that night was refused, but the following morning the conditions were so much worse that the members of the family themselves saw the change, and consented to an operation.

Upon opening the abdomen there was a free gush of beef-broth-like fluid, and some evidences of fat necrosis. The pancreas was rapidly exposed and found to be profoundly hemorrhagic. The oedematous infiltrate extended retroperitoneally toward the hepatic flexure and the ascending colon. Palpation

of the gall-bladder showed that it was filled with numerous small stones, 70 in all being removed by cholecystotomy. The peritoneum over the pancreas was punctured in several places, and a cigarette drain was inserted to its site. The patient reacted well from the operation, and for several days there was free drainage of a musty, mucilaginous material. The edges of the wound showed fat necrosis in the panniculus adiposus. The patient was placed in a semi-sitting posture in about two days and left the hospital at the end of the fourth week, the wound then being practically closed. Now, at the end of fifteen months, the patient is entirely well, with the exception of slight digestive disturbances. She had gained in weight.

Examination of the urine at the time of the operation proved negative as to sugar. No Cammidge test was made on account of the emergency.

#### GASTRO-ENTEROSTOMY (ROUX) FOR CONTINUED VOMITING.

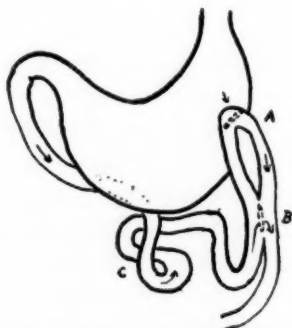
DR. CHARLES A. ELSBERG presented a woman, 23 years old, who was first operated on in Berlin three years ago by Prof. Israel for acute appendicitis. About a year later, on account of symptoms of gastric ulcer, with vomiting of blood, she was operated upon by Krause of Berlin, who did a gastro-enterostomy. After this operation she developed signs of vicious circle; she was again operated upon, and an anastomosis was made between the ascending and descending loops of the jejunum. After this last operation the vomiting ceased.

The patient was admitted to the medical service of the Mt. Sinai Hospital in July, 1908, with the history of having suffered from vomiting and diarrhoea for the past three weeks. She was put upon rectal alimentation and careful treatment, but in spite of all that could be done the vomiting persisted and she emaciated rapidly. A number of times during the day and night she would expel from the stomach large quantities of green fluid, sometimes streaked with blood.

Dr. Elsberg was asked to see the patient in consultation with Dr. Libman, and agreed with him that an exploratory operation was urgently indicated. On July 31 he opened the abdomen through an incision to the left of the old scar, and found the stomach and intestines bound together by abundant adhesions.

It was almost impossible to trace the course of the intestines until a large number of adhesions had been divided. Finally, he was able to follow the course of the duodenum and jejunum, and to understand, as he thought, the condition of affairs. From the duodenojejunal junction the bowel passed downwards, then upwards and to the right, underneath the first portion of the jejunum; then back again to the left side and then upwards to the anterior wall of the stomach, where the anastomosis had been made. There was also a broad anastomosis between the afferent and efferent loops of jejunum. Two fingers could be passed with ease through both of the stomata. The only point of note was that the anastomosis between the stomach and jeju-

FIG. 1.



Condition found at first operation: A, gastro-enterostomy; B, entero-anastomosis; C, twist in jejunum.

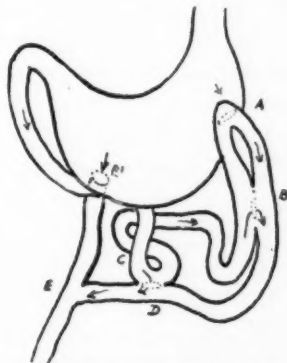
num had been made very high up on the fundus. The jejunum that formed a loop underneath the first part of the jejunum was compressed and could not be freed. Evidently, an anterior gastro-enterostomy with a large loop had been made, and this loop had become twisted upon itself in the manner described. The pylorus felt normal. Believing that the trouble lay in the twisted loop of jejunum, Dr. Elsberg made an anastomosis between the jejunum beyond the old gastro-enterostomy and the twisted loop of jejunum (see Fig. 2).

In spite of this operation, the vomiting continued, enormous quantities of bile being expelled from the stomach at frequent intervals. The patient was carefully examined for evidences of some other disease to which the vomiting might be secondary,



and the possibility of a neurosis or hysteria was considered, but nothing could be found. Inasmuch as all parts of the jejunum were now well drained (see Fig. 2), the only possibility was that on account of the position of the anastomosis there was a valve formation at the stoma high up, near the cardia. The patient's condition became progressively worse, and another operation was decided upon. The abdomen was again opened through the old scar, and as the various anastomoses were found patent, Dr. Elsberg said he determined to do an entirely new gastro-enterostomy, and chose the method of Roux. A very large mass of adhesions had to be divided before the transverse mesocolon near the pyloric end of the stomach could be exposed.

FIG. 2.



After second operation: D, entero-anastomosis made at first operation; E, E', gastro-enterostomy en Y made at second operation.

An opening was made into it, the jejunum divided (see Fig. 2), and an anastomosis was made between the jejunum and the posterior surface of the stomach near the pylorus, by suture. Before this was done, an end-to-side anastomosis was made between the proximal jejunum and the peripheral jejunum by means of a Murphy button. One part of the button was pushed down into the peripheral jejunum in the manner described some years ago by Dr. Robert F. Weir.

The patient stood the prolonged operation well, and for two days the vomiting was slight. Then, in spite of all treatment, she began to vomit again, and this continued for ten days, no matter whether food was taken into the stomach or not. At this time the button was passed, and within 24 hours

the vomiting ceased. The patient began to take food regularly, and she rapidly gained flesh and strength. The wound healed by primary union, excepting for a small drainage opening. Since the last operation she had gained about 30 pounds in weight; she felt perfectly well and had resumed her work as a nurse.

#### RESECTION OF INTESTINE PRESENTING UNUSUAL FEATURES.

DR. ELSBERG presented a boy, fourteen years old, who had been operated on in August, 1907, for acute appendicitis, with abscess and diffuse peritonitis. In January, 1908, he was readmitted into Mt. Sinai Hospital with symptoms of acute intestinal obstruction of 36 hours' duration. At the operation, which was done at once, a loop of ileum was found gangrenous and constricted by a broad band. In spite of the presence of fecal vomiting, the patient's condition was so good that a radical resection was determined upon. Twelve inches of the ileum were removed and an end-to-end anastomosis made by suture. After twenty-four hours the fecal vomiting ceased, and thereafter the boy made a steady recovery for ten days. At that time, when only a sinus remained, he suddenly developed symptoms of acute obstruction, and within a few hours his general condition was very serious. Just prior to his removal to the operating room it was noted that there was a slight feculent discharge from the sinus.

The abdomen was again opened through the first scar, and a large loop of intestine, including the former anastomosis, was found constricted by a band, and its vessels thrombosed. Through the distention of the affected loop, the anastomosis had given way at one point. This time about three feet of intestine were removed, the peripheral end being near the ileocaecal junction. The patient's condition was so poor that all operative manipulations had to be rapidly done. The bowel was removed in the usual manner, the ileocaecal end closed by a double layer of sutures, a tube tied in the ileum, and the end of the bowel fixed in the wound, thus forming an iliac anus. Although the patient was in extremely poor condition at the end of the operation, he recovered after energetic stimulation. After a few days the tube came away, and it was impossible to control the discharge

of fæces from the bowel. The patient was continually bathed in fæces, and was in a deplorable condition.

Ten days later Dr. Elsberg opened the abdomen a third time, this time by an incision to the left of the median line, as far away as possible from the artificial anus. After some difficulty, the ileum which led down to the anus was found, and at a point about two feet from the artificial anus an ileocolostomy by lateral anastomosis was done, by suture. By this means he hoped to divert the fæces into the colon, but in spite of the fact that a large opening had been made and that the stoma was patent (as was proven by the injection of fluid into the rectum and its appearance at the artificial anus), most of the fæces still came out of the artificial anus. Every possible means to control this, by means of distended rubber bags in the bowel, by pressure, by keeping the boy in the Trendelenburg posture, etc., were tried, but without success. He was continually bathed in fæces, his skin was raw and very tender and he was rapidly emaciating.

At the fourth and last operation the speaker said he planned to close the bowel peripherally to the ileocolostomy, and then extirpate the intestine down to the artificial anus. On account of the many adhesions, this could not be done, so he united the ileum beyond the ileocolostomy again to the descending colon by lateral anastomosis, by suture, closed the gut just beyond the stoma, and extirpated the entire bowel distal to this point. The removal of the bowel, about eighteen inches long, was rendered very difficult through many old adhesions. It was accomplished by the following method: The mesentery was first tied and cut off, the end of the bowel grasped by a clamp, inverted into itself, and made to emerge through the artificial anus on the right side. It was excised from there as soon as the left abdominal incision had been closed. The patient made a good recovery from this operation; he rapidly gained flesh and strength, and was discharged, cured, one month after the operation.

#### EXCISION OF THE GREATER PART OF THE COLON.

DR. JOHN F. ERDMANN presented a man, 33 years old, who gave a history of having suffered for about two years with attacks of indigestion and cramp-like pains, and that he had lost from 35 to 40 pounds in weight. When Dr. Erdmann first

saw him, on November 16, 1907, he gave no record of having lost flesh, and only a brief history of spasmodic pains in the abdomen, simulating a gall-bladder or mild appendix attack. His temperature at this time was  $100^{\circ}$ ; pulse about 80, and there was no point pressure anywhere in the abdomen excepting over the appendix. There was no history of any associated trouble in the abdominal cavity, which pointed to the conditions found at the subsequent operation. He had been under the care of some of the best internists, and a diagnosis of gall-bladder and appendix invasion had frequently been made.

*Operation.*—Through a Kammerer incision the appendix was exposed and removed. It was seven inches long, about half an inch in diameter, its lumen was widely distended and its coats were thin, and it was adherent in the pelvis. No evidence of intestinal obstruction or disturbance was found at this time. The patient was relieved from all abdominal symptoms for a period of three days, and stated that he felt better than he had for months. Movements of the bowels were obtained until the fifth day, when he began to be restless and showed marked evidences of abdominal cramps, the centre of the disturbance being near the splenic region. It was evident at this time that some gross lesion, obstructive in nature, was present, and it was suspected of being in the large intestine. The patient was observed for another twelve hours. He then began to vomit fecal material, and was immediately submitted to operation for intestinal obstruction. The stomach was washed out and then the abdomen was rapidly opened. The site of the obstruction was found to be at the splenic flexure, and consisted of an annular growth about an inch in length, and completely surrounding the colon. Owing to the distention of the small intestine, an enterotomy was done; the intestines were stripped and washed with salt solution. The opening was then sutured and the sigmoid attached to the cæcum by means of a Murphy button. After the completion of the sigmoidocæcostomy, the patient's condition was such that it was deemed inadvisable to remove the growth, and this was deferred to a later day. The patient was put to bed in a condition of collapse. The button was passed on the eighth day, and the patient left the institution in the third week, refusing to have the excision of the growth done until he had recuperated by going away for a short time.

He finally consented to have the tumor removed on February 29, 1908, a little over three months after the second operation. At this time, the growth was exposed without difficulty: it had increased to almost twice its former size, and a few glands were evident in the mesocolon. The colon, owing to the invasion of the glands, was excised from the ascending to the beginning of the descending colon, the free ends being simply turned in and left as blind pouches. The patient made a speedy recovery, and had since gained thirty pounds in weight. He had previously gained twenty pounds between the second and third operations. Up to the present time there were no evidences of a recurrence. Pathologically, the growth was reported as being a colloid carcinoma.

#### PROSTATECTOMY.

DR. JOHN F. ERDMANN presented a man, 41 years old, who was referred to Dr. Erdmann by Dr. John F. Moore in April, 1908. There was no history of gonorrhœa, syphilis or any genito-urinary trouble. Three years before, or at the age of 38, he had suffered with difficulty in voiding urine, having to get up three or four times during the night, and voiding small amounts every fifteen to sixty minutes during the day. There had been slight evidence of blood in the urine for the past year. An analysis of the urine showed some albumin and considerable pus and decomposed material.

Examination showed a bladder distended almost to the umbilicus. The patient complained of considerable pain, with inability to void urine, and suffering from a dribble overflow. The catheter withdrew sixty ounces of urine. He stated that he had been catheterized once in forty-eight hours for the past two weeks, drawing off a large quantity of urine each time. A No. 20 F. catheter passed easily, and no evidences of prostatic enlargement were made out.

When the patient returned for examination the following day he was again catheterized, withdrawing thirty-five ounces of urine. Attempts at cystoscopy failed, due to ultra-sensitiveness and cloudy urine. He was then admitted to the Private Hospital Association, and for a week was kept under observation with careful catheterization, irrigation, etc., and at the end of that time it was decided to do an exploratory operation in case

cystoscopy under anæsthesia revealed the causes of the obstruction. Upon one occasion, 100 ounces of urine were withdrawn at a single catheterization.

On April 18, 1908, an attempt at cystoscopy failed on account of the current being out of order. It was deemed advisable, as the patient had given his consent, to do a cystotomy and make a direct examination. This revealed a small nodule, ball-valve in character, about the size of a marrow-fat pea, springing from the upper margin of the inner meatus. The prostate, by internal palpation, was of about normal size. Further examination of the bladder showed the ureteral orifices sufficiently dilated to admit the tip of the little finger. The prostate, together with the so-called enlargement, which acted as a ball-valve, was removed. The patient, who had previously been in a very poor state of health, reacted promptly from the operation, and since then his weight had increased from 128 to 159 pounds, his usual weight being about 170 pounds. From the time of the operation up to the present time he has been able to void his urine spontaneously, with a varying amount of residual, between two and six ounces. He was now able to pass a stream with perfect ease. The urine at present was clear, and presented absolutely no evidence of decomposition. No tubercle bacilli nor coli commune were found in the urine during his stay in the sanitarium. Since then he had been seen about once a month, the catheter introduced and the residual withdrawn, no effort being made at irrigation. No cystoscopic examination had been made, the residual urine being attributed in all probability to atony. At the present time, dilatation of the urethra and internal meatus was being done once a week.

#### HYDRONEPHROSIS FROM ABNORMAL URETERAL IMPLANTATION.

DR. JOHN P. ERDMANN presented a man, 28 years old, who was admitted to the hospital on July 1, 1908. The history he gave was that he had been irregular in his habits as regards eating and sleeping, and that he had used alcoholics moderately. He had no recollection of having had any of the diseases of childhood, nor any venereal disease. His first illness, about three years ago, began with dull pain in the left lumbar region; this



would last for two or three days and then disappear for several months, only to recur. Recently, the intervals between these attacks of pain had been shorter.

His present illness began about ten days ago, with pain in the left lumbar region, which became so severe and sharp that he could not sleep nor lie still in bed, nor could he walk about. This pain had persisted for several days.

Upon examination, the abdomen was not quite symmetrical. There was moderate bulging of the left side, between the crest of the ilium and the first rib. There was tenderness, moderate rigidity and flatness over this tumor, which seemed to be over the left kidney or the kidney pelvis site. There was dullness, swelling and tenderness over the left lumbar region, extending around to the spine. The patient complained of constant and great pain over this tumor. The extremities were normal. An X-ray, taken by Dr. Caldwell, was negative of kidney calculus. The urine was also negative.

*Operation, July 3, 1908.*—An incision, six inches long, was made parallel with the crest of the ilium and two inches above it, beginning at the tip of the twelfth rib posteriorly. The kidney was easily exposed and brought into the wound. The following conditions were found: (1) A small, hydronephrotic sac at the lower pole of the kidney. (2) A very small, narrow ureter issuing from the lower part of this sac, and kinked upon itself when the kidney was in its abnormally usual position of nephaptom. (3) The kidney was much smaller than usual, and was prolapsed.

An incision into the ureter showed that its lumen was patent, but very narrow. A grooved director, passed through the cortex, revealed no stones. The kidney was packed up higher in the lumbar region by means of gauze about the lower pole, to replace it normally, thus relieving the ureteral kink. The small incision into the ureter was left unsutured, a gauze drain being passed down to the ureteric incision and brought out to the lumbar wound. All dead spaces were packed with gauze, and the wound sutured in tiers with No. 2 chromic gut, leaving a space about the middle for exit of the drain ends. Dry dressing.

The patient's postoperative course was normal. There was very little leakage; the wound closed, and the patient left the



hospital in three weeks. Since then he had had no further attacks of pain.

DR. WILLY MEYER said that during the past summer he had to operate on a case of intermittent hydronephrosis where there was a very large sac, and where the ureter was turned on itself so that it came in contact with the sac. The case was treated by doing a plastic operation by the Finney method, and the patient made a perfect recovery.

#### SYMMETRICAL ADENOLIPOMA OF THE NECK.

DR. ELSBERG, for Dr. Howard Lilienthal, presented a man, 45 years old, with an extensive development of adenolipomata on both sides of the neck and extending down on the chest. The interesting feature of the case was the symmetrical character of the growths. Some of these tumors had been excised and examined, and had been found to contain only fatty tissue. A similar case had been shown at a meeting of the Society some years ago by Dr. Erdmann.

Dr. Elsberg said that at least fifty per cent. of these cases, according to Charcot and Marie, succumbed to pulmonary tuberculosis within five years after the inception of the disease. This patient thus far showed no pulmonary symptoms.

#### SPLENECTOMY FOR SPLENIC ANÆMIA (RESECTION OF COSTAL ARCH).

DR. WILLY MEYER presented a man, 41 years old, who entered the German Hospital on October 27, 1907, with all the symptoms of a chronic severe disease of the blood. After careful examination the case was regarded as one of pernicious anæmia. At the time of the patient's admission, he was lemon-colored. The heart and lungs were normal. There was marked enlargement of the spleen; the liver was slightly enlarged, and there was some glandular enlargement. An examination of the blood showed 1,260,000 red blood corpuscles, 4800 whites, and 40 per cent. of hæmoglobin. His condition was so poor at this time that the house surgeon, Dr. Ottenberg, made a transfusion from man to man by the method devised by himself, a description of which appeared in the *ANNALS OF SURGERY* (1908, xlvii, 486). The possibility of the case being one of Banti's disease was also considered at this time. Under various methods of treatment, the

blood condition slightly improved. He left the hospital, in February, 1908, but returned again on March 13, 1908, complaining of such intense abdominal cramps in the region of the enlarged spleen that he demanded operative relief, if possible. The direct transfusion had not been of much benefit, inasmuch as he had the same percentage of hæmoglobin and number of whites as formerly, the red blood-corpuscles were 2,072,000. After further study of the case by D. F. Kaufmann, of the German Hospital, it was thought that removal of the spleen might effect a cure. This operation was done on March 23. The spleen was exposed through a median incision; it was much enlarged, and upon introducing the hand into the vault of the diaphragm, a few adhesions were found anteriorly, and a broad band posteriorly, adherent to the diaphragmatic and third dome posterior abdominal wall. A transverse incision at right angles to the first, just above the umbilicus, and meeting the tip of the tenth rib, was added, and in order to gain more room it was lengthened still further toward the tip of the eleventh rib, parallel with the costal arch. The incision downwards was then lengthened, with excision of the umbilicus, and osteoplastic resection of the costal arch done. For the latter purpose the linea alba was incised to the left laterally, and the sheath of the rectus opened. The muscle was then loosened from the posterior sheath and peritoneum, and the arch exposed. The superior epigastric artery and vein, sending many branches to the muscle, required numerous ligations, between which the branches were divided. The seventh, eighth, ninth and tenth costal cartilages were then divided with the knife immediately in front of the ribs, also the union of three at the sternum, and the resection of the costal arch completed without the infliction of any injury to the surrounding structures.

The skin flap was now turned back and the arch raised by an assistant. This gave decidedly more room, and the spleen could now be freely luxated. It measured about 15 x 6 x 4 inches, and there was a firm broad band binding it down to the parietal peritoneum at the diaphragm and the descending colon. These were divided between ligatures under guidance of the eyes. The pedicle of the spleen was firmly adherent to the tail of the pancreas, and because of hemorrhage, a clamp was placed around the latter; it was then firmly compressed and a chromicised cat-

gut ligature put in place, a second clamp having been placed nearer the spleen temporarily. The parts were then divided and the spleen thus removed with a portion of the pancreas. Then the wound closed. The patient made an uneventful recovery from the operation, and since then his general condition had steadily improved. Whereas before the operation the red blood-cells numbered 2,072,000, they now numbered 4,300,000, the white 13,000 and the hæmaglobin has increased from 40 to 90 per cent.

Dr. Meyer said he had resorted to osteoplastic resection of the costal arch in four cases, three of them being operations on the spleen and one on the stomach. It should only be done in those cases where its line of descent interferes with the proper exposure of the parts.

IMPERMEABLE CICATRICAL STRICTURE OF THE  
ŒSOPHAGUS; FEEDING THROUGH GASTRIC  
FISTULA FOR TWELVE YEARS.

DR. MEYER presented a boy, eighteen years old, who in February, 1896, swallowed, by mistake, a large quantity of caustic lye, resulting in an œsophageal stricture. The case was originally presented by Dr. Meyer before the New York Surgical Society on January 7, 1904, and was subsequently reported in full in *The Medical News*, October 29, 1904. Ten days after swallowing the lye he was admitted to one of the city hospitals, where gastrotomy and division of the stricture by Abbé's string method, at the same sitting, were done one month later. Under suitable after-treatment, the boy was soon able to take food again by way of the mouth. In spite of all that was done, however, the œsophagus showed great tendency to re-contraction. After a few months the stricture had re-formed, and a gastric fistula, according to Witzel's method, had to be established. All attempts at passing the stricture of the œsophagus from above or below were unsuccessful, and the boy had to be fed entirely through the gastric fistula. Seven years later (September, 1903), when the patient was brought to the German Hospital, the entrance into the stricture was so tight that it was impossible to pass even a filiform bougie into the stomach by way of an œsophageal fistula at the neck, which had been made for the purpose. On

December 1, 1903, an osteoplastic gastrotomy was done by Dr. Meyer in order to gain a passage through the œsophagus from below, raising the costal arch, but this also failed.

At the present time, twelve years after the original injury, the boy was still being fed through his gastric fistula, and Dr. Meyer thought it would be futile to make any further attempts to re-establish the patency of the œsophagus, which was evidently the seat of a very extensive cicatricial obliteration. The patient was fairly well nourished. He had gained 26 pounds within the last two years, and now weighed 106 pounds. The method by which he was fed was as follows: He was instructed to partake of a mixed ordinary table diet, and in order to get the benefit of the admixture of the saliva, which was doubtless an important factor in digestion and nutrition, and at the same time to enjoy the taste of his food, he masticated his food thoroughly and then removed it from his mouth into a cup and introduced it into the stomach with the help of a large syringe through the gastric fistula. The boy was a very hearty eater and had at present a tremendously enlarged stomach. Recently, he had been seized by epileptiform attacks, and he had been instructed to wash out his stomach regularly, and take six or eight small meals during the day instead of three large ones, with a resulting improved condition. This was one of the very rare cases that had been successfully nourished through a gastric fistula for many years.

#### PERICARDIOTOMY FOR TUBERCULOUS EFFUSION.

DR. MEYER presented a man, 33 years old, who had been an inmate of the German Hospital for some time. His left pleural cavity had been repeatedly tapped and large quantities of a straw-colored fluid had been evacuated. No tubercle bacilli had been found in this fluid. However, the Calmette test was positive. The man's general condition was poor. Examination showed the presence of fluid in the pericardium.

On March 10, 1908, at the request of Dr. Kaufmann, a large needle was introduced by the speaker into the pericardium in the sixth intercostal space, close to the sternum; it was pushed upward and outward, and immediately gave exit to a large quantity of black fluid, about 1250 c.c. being withdrawn. The man was much improved after this operation, but eight days

later he again showed symptoms pointing to a recurrence of the pericardial effusion. On March 17 the needle was again introduced, evacuating about 1000 c.c. of the same black fluid. There was but slight improvement after this second operation, and again the fluid rapidly re-accumulated.

On March 23, 1908, under local anæsthesia, an incision was made from the middle of the sternum over the course of the sixth rib. The cartilage was divided with Gigli's saw near the rib, then elevated and cut through with the scissors at the sternum, and the remains removed with the rongeur forceps. On dividing the tissues parallel with the sternum, the internal mammary artery was exposed and ligated. The pleura was punctured, and a large amount of straw-colored serous fluid escaped. In order to gain more room, an excision of the seventh cartilage was necessary. The rent in the pleura was covered with a pad of gauze, and the pericardium exposed. It was aspirated, giving exit to the same black fluid that had been found at the former paracentesis. The pericardial membrane was then freely incised, evacuating at least three quarts of fluid. The finger was introduced into the large pericardial cavity, but the heart could not be felt. On pushing the finger upward, a mass of coagulated fibrin was felt, which, when cleared away, allowed the heart beats to be felt. The rest of the fluid was then thoroughly evacuated, and by prolonged use of sponges on handles all the fibrin of grayish-black color was removed. A large-sized drainage tube was then introduced, and the pericardium irrigated with warm saline solution. By holding apart the edges of the incision in the pericardium, which was enlarged by a short transverse incision inwards, the cavity of the pericardium could now be beautifully illuminated with the electric light, and the comparatively small pulsating heart was clearly seen, high up, hanging on its vessels. By this time the patient's condition had materially improved. Two long drainage tubes were introduced into the pericardium, and the skin incision was closed with a few silk-worm gut stitches. The patient was put to bed in excellent condition, the upper end of the bed being raised. He made a rather slow, but perfect recovery. His condition at the present time is excellent.

ACCIDENTS IN HERNIA OPERATIONS, WITH ESPECIAL  
REFERENCE TO THE VESSELS.

DR. JOHN F. ERDMANN read a paper with the above title, for which see page 208.

DR. WILLIAM B. COLEY said that from personal communications, he knew of four instances of injuries to the arteries or veins from needle puncture during the insertion of the deep sutures in Poupart's ligament. The results in these cases were of interest. In one case, the operation was done for strangulated hernia. The iliac vein was badly injured during operation, and the leg had to be amputated. In the second case the vein was opened; it was closed by lateral suture, with uneventful recovery. In the third case the right iliac vein was injured during operation for inguinal hernia in a girl of 18. In this case the needle was introduced from above downwards, and the surgeon stated that it required an extensive dissection in this region before the opening of the vein could be caught with forceps, and a lateral ligature applied. The remaining steps of Bassini's operation were then completed, and a satisfactory recovery followed.

In the fourth case, the patient, 64 years old, had been operated on for strangulated inguinal hernia on one side, and after that operation was completed, a further operation for a large, irreducible hernia on the other side was performed. The notes of the surgeon who did the operation stated that when passing the needle through the under surface of Poupart's ligament, he removed his finger from the tissues about the iliac artery too quickly, caught it with the needle, and when tied, the thread cut through the atheromatous artery. When he removed the stitch, a deluge of blood followed, showing that the external iliac artery had been wounded. It was compressed with the fingers until it could be secured by a clamp, and a ligature above and below was then applied. The patient made a tedious recovery, with slight sloughing of the calf and heel.

Dr. Coley said he believed that this accident could be always avoided if the following precautions were observed: The first and most important of these, he thought, was to see that the needle was always inserted in Poupart's ligament from below upward instead of from above downward (*i. e.*, it should be first introduced into the internal oblique muscle, and then into Pou-



part's ligament, instead of vice versa). (2) The ligament should always be pulled slightly upwards and inwards by thumb forceps during the introduction of the sutures. (3) If the needle be held with the fingers instead of a rigid needle-holder, the danger of injuring the vessels will be still further lessened.

Dr. Coley said he had personally operated upon upwards of 2,200 cases of inguinal and femoral hernia, 1,000 adults and 1,200 children, without ever having met with an accident of any kind. At the Hospital for Ruptured and Crippled, 2,340 operations had been performed by Drs. William T. Bull, John B. Walker and himself, without accident, due largely, he thought, to the observation of the precautions stated.

As regarded injury in bladder hernia, in practically every hernia of the bladder that he had seen there had been present a large amount of peritoneal fat. In the presence of this fatty tissue outside of the sac he was always suspicious of a bladder hernia, and took the usual precautions. Thus far he had never injured the bladder.

Dr. ERDMANN said that when he had described his method of inserting the needle as from above downwards, he meant from the proximal to the distal position of the body as it lies on the operating table.

Dr. WALKER said that in operating for femoral hernia he had never seen the bladder. He could recall only one case where a vessel was injured during a herniotomy, and in that instance the needle was passed downward through the Poupart's ligament and then upward through the internal oblique. The tip of the needle perforated too deeply through the ligament, tearing into the epigastric artery. Troublesome hemorrhage followed. A clamp was applied to the site of the vessel and removed at the end of forty-eight hours. A normal recovery followed.

Dr. BLAKE said the expressions, "passing the needle from above downwards" or from "below upwards," were somewhat ambiguous, unless it was understood that they were to be taken in an anatomical sense, and not in relation to the position of the patient.

#### OPERATION FOR PULMONARY EMBOLISM.

Dr. WILLY MEYER described the operation proposed by Prof. Trendelenburg, of Leipsic, before the last German Surgical Congress, for embolism of the pulmonary artery. He ex-



hibited the instruments that were used, and presented to him by Prof. Trendelenburg, to facilitate the operation, which was a delicate one, requiring a resection of the three ribs with their cartilages and the opening of the pleura and pericardium. The operative work naturally involved great skill and dexterity. Dr. Meyer said that one could not but feel great admiration for Trendelenburg, who at an advanced age had the energy and courage to initiate and carry on the experiments for the relief of this condition in animals, and test it afterwards in the human being. Although his patients operated on had not definitely recovered, the feasibility of the operation had been clearly demonstrated. With proper training of nurses and assistants, to promptly recognize the trouble, the hope might be entertained that a number of these otherwise hopelessly lost patients might be saved in the future.

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*Stated Meeting, November 25, 1908.*

The Vice-president, DR. ELLSWORTH ELIOT, Jr., in the Chair.

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#### GENERAL TUBERCULAR PERITONITIS.

DR. IRVING S. HAYNES presented a girl of eight years who was admitted to the Harlem Hospital on January 14, 1908. According to her family history, one maternal aunt and uncle died of tuberculosis. The patient had measles two years ago, and had suffered from bronchitis and cough for several years.

*Present History.*—About December 15, 1907, the mother noticed that the child's abdomen was beginning to grow larger. This had continued up to the present time. There had been no pain. The urine had been diminished in quantity. She had had fever and night-sweats.

Upon examination, the abdomen was found to be generally enlarged. It was flat on percussion, excepting over an area above the umbilicus, which was tympanitic. This tympanitic area changed with a change of position, and the presence of free fluid in the abdominal cavity was shown by percussion and ascitic waves. The urine was normal. Temperature, 103; pulse, 132.

An examination of the blood showed 8,500 white cells and 2,240,000 red cells.

The case was diagnosed as one of tubercular peritonitis, and was operated on by Dr. Haynes on January 16, 1908. An inter-muscular incision, two inches long, was made over the appendix. Free, blood-tinged fluid was found in the peritoneal cavity. The peritoneum, intestines and omentum were thickened, and of a deep red color. The superficial blood-vessels were prominent, and the surfaces were studded with tubercles. The mesenteric glands were enlarged. The appendix was removed, its stump cauterized and inverted into the cæcum by a purse-string suture. A saline irrigation was then given for its possible curative effect on the tubercular process. The abdomen was closed by layer sutures.

Following the operation, the child's temperature gradually fell from 103 to 99, and the pulse from 130 to 90. The wound healed by primary union, and the patient's health steadily improved. Internally, she was given cod-liver oil and guaiacol carbonate. She left the hospital on February 2, 1908. About a month later the abdominal wound opened throughout its entire extent, discharging a bloody serum, with small cheesy masses. The wound was treated with injections of balsam of Peru, argyrol, and aristol. The child was kept out of doors, with careful attention to her general nutrition, and the guaiacol carbonate was continued for several months. The abdominal sinus gradually closed, and finally healed about October 1. The patient had increased in weight and was apparently in good health at the present time.

DR. HOWARD LILIENTHAL said he had seen quite a number of cases of tuberculous peritonitis in individuals varying in age from very early childhood to late adult life, and most of the cases he had operated on had recovered. He believed that operation unquestionably had a great deal to do with the favorable outcome, in spite of the fact that that question was still under discussion. He had noticed that the most favorable cases for operation were those where the abdomen contained a large amount of fluid, while the dry form was less favorable for surgical intervention, although they may be proper cases for operation on account of the obstructive symptoms.

During the past four years, Dr. Lilienthal said, he had been

using the old tuberculin as a supplement to the surgical treatment, beginning with one forty-thousandth of a milligram, and not running the dose high enough to cause a reaction. He was convinced that this was of real value, and that it should be used more frequently. In the case shown by Dr. Haynes there was a decided irregularity of the abdominal outline in one area, suggestive of the presence of adhesions and a probable recurrence of intestinal obstruction in the near future.

DR. ALEXANDER B. JOHNSON said that his experience, in common with that of others, was that those cases of tubercular peritonitis associated with a considerable accumulation of serum in the abdomen were the only ones that were usually notably benefited by surgical intervention, and even those had not always done well. In that group of cases attended by localized accumulations of broken down tubercular material and infiltration of the intestinal coils with tubercles, the results had not, in his hands, been satisfactory. In those cases where the process was a dry one, and one found simply an obliteration of the peritoneal cavity, his results had not been very favorable. While those patients had not been injured by operation, they had not been benefited.

Dr. Johnson said that about ten days ago an elderly woman was brought to the hospital with symptoms of obstipation. The bowels had been extremely difficult to move, and upon examination he found what he considered to be a number of distended coils of large intestine. After repeated enemata he could still feel a large sausage-shaped tumor along the course of the descending colon. Upon opening the abdomen in the left iliac region he found a tubercular peritonitis, with complete obliteration of the peritoneal cavity. The tumor that had been felt proved to be a mass of tubercular omentum.

DR. JOHN ROGERS called attention to the fact that a fecal fistula occasionally followed operative interference with these cases, particularly those of the adhesive type. If that accident occurred, there was no escape from a fatal outcome.

DR. JOHN B. WALKER mentioned the case of a girl of sixteen years who was operated on for a tubercular peritonitis which apparently originated in the appendix. A fecal fistula followed, and the case resulted fatally in about six months.

DR. LILIENTHAL thought the statement made by Dr. Rogers was rather too sweeping, unless he limited it to true fecal fistula

(of the small intestine). Personally, he could recall two cases of fecal fistula of the colon following operation for tuberculous peritonitis, and in both instances the patients recovered.

DR. ROGERS mentioned two cases in which a fecal fistula resulted, in spite of the great care that was taken not to tear or manipulate the gut. The abdomen was simply opened and flushed out.

DR. JOHNSON said that about two months ago an Italian girl, about 16 years old, was brought to the hospital complaining of swelling of the abdomen, pain, tenderness and fever. There was marked increase in the leucocyte count, with a relatively high increase of the polymorphonuclears. No positive diagnosis was made prior to operation. Upon opening the abdomen he found an ovarian cyst of considerable size, containing perhaps a quart of fluid, which proved to be tuberculous. There was also a very large abscess outside of the ovarian cyst, the contents of which had a very strong fecal odor. The coils of small intestine, as far up as the umbilicus, were the seat of a peritonitis. In separating the various adhesions and emptying the cyst, he came upon a large lumbricoid worm, but it was impossible to locate the perforation in the small intestine from which the worm had escaped. After the operation practically all the contents of the small intestine escaped through the wound, but by careful attention to the after-treatment, regulating the diet, keeping the wound packed and strapped, the patient finally recovered. The tract leading to the fistulous opening was deep and this he believed rendered the chances of spontaneous closure better.

DR. ARTHUR L. FISK said that about fifteen years ago he was asked to operate upon a young man of 25 years, who had typical signs of appendicitis, with a mass in the right iliac fossa. The usual incision was made over the site of the appendix, and when the peritoneum was opened, the caput coli was seen thickly studded with tubercles, and the wall of the bowel was greatly infiltrated. The abdominal incision was closed without any drain; no operation was performed on the bowel. Within three weeks after, a fecal fistula developed in the site of the abdominal incision; the patient died within two months thereafter.

Dr. Fisk recalled four other cases of tubercular peritonitis, which he had operated upon; in three of these the peritoneum was covered with tubercles and there was fluid within the peritoneal

cavity, these cases were all benefited by the operation; but the fourth case was of the dry adhesive variety, and this case was neither helped nor injured by the operation.

DR. WALKER mentioned the case of a woman, about thirty, upon whom he operated for tubercular peritonitis, evacuating a large amount of fluid. Five years later the patient was again operated, this time for appendicitis, and at this operation no adhesions were found, and no evidences of the former peritonitis.

DR. JOHN A. HARTWELL said that in discussing this subject, we should bear in mind the different forms of tubercular peritonitis. In the case shown by Dr. Haynes, the inflammatory process was apparently limited almost entirely to the peritoneum, without any involvement of the other intra-abdominal structures except the possibly primary focus in the appendix. The cases where the intestines were intensely matted together belonged to another class, and their treatment was entirely different. Under those conditions, a simple laparotomy was very apt to produce a fecal fistula, whether the intestines were handled or not. The speaker said he had seen several such cases at the Lincoln Hospital in colored patients, and in spite of every precaution a fecal fistula developed in three or four of them, with fatal results. Those could not be properly classified as simple tubercular peritonitis.

Dr. Hartwell said that in a case seen at Bellevue Hospital, the patient, in addition to the tubercular peritonitis, had tuberculosis of the ascending colon, which was occluded to such an extent by the inflammatory process that it barely permitted the passage of a probe. Such cases he did not think could be benefited by operation, unless it were possible to remove such foci, which, in those cases with extensive intestinal involvement, it is impossible to do.

DR. FISK said that the distinction between these different forms, which Dr. Hartwell made, was not the usual one. These varieties are progressive stages of the same disease—tubercular peritonitis. The early stage is characterized by the formation of tubercles over the peritoneum and fluid within the cavity; a later stage by great thickening of the walls of the bowels, adhesion (cohesion better) between the peritoneal surfaces of the different coils of the intestines, even to obliteration of the peritoneal cavity; and, possibly, finally the formation of abscesses.

DR. ELLSWORTH ELIOT, JR., said that he had seen two cases of

tubercular peritonitis with the subsequent formation of fecal fistula, one of the large and one of the small intestine. The first patient was a girl of twelve years upon whom laparotomy was done for a simple serous tubercular peritonitis. The fluid was removed without damage to the intestines and the wound closed without drainage. The patient left the hospital healed but several weeks later developed an intestinal fistula which discharged for months. Eventually, the fistula closed spontaneously, the child gained in strength and flesh and five years after the operation was still in perfect health without sign of relapse.

The other case was one of advanced tubercular peritonitis of pelvic origin with evidences of beginning cheesy degeneration. Laparotomy and drainage of an extensive pyosalpinx was resorted to. The bladder and rectum subsequently became involved in the tuberculous process and about two months later, the laparotomy wound being still open, the patient developed a spontaneous fistula of both of those organs communicating with each other and with the drainage sinus. The patient succumbed about six weeks later to general miliary tuberculosis. In a third case of tubercular peritonitis of the connective-tissue type in a man 22 years of age, laparotomy was done, but accomplished nothing save the separation of adhesions. Subsequently, his abdominal wound healed, his constitutional symptoms disappeared, and he remained in perfect health and able to work for six months. He then developed a tubercular meningitis which proved fatal.

DR. JOHNSON said he wished to record another case of tubercular peritonitis involving the cæcum and ascending colon in which he operated with the idea that he had to deal with an appendicitis. Upon opening the abdomen, he found the cæcum converted into a thick-walled tube, infiltrated with tubercle. The patient was a girl of fourteen years who had been operated on for tubercular glands of the neck by Dr. Johnson, and after the wound in the neck healed she developed symptoms referable to the abdomen. Subsequent to the abdominal operation she developed a fecal fistula, for which she was afterwards operated on at the City Hospital by Dr. H. D. Collins, who resected the cæcum and a portion of the ascending colon and then made an anastomosis. After this the girl remained well for many months, and finally died of tubercular meningitis.



## INTESTINAL OBSTRUCTION DUE TO TUBAL PREGNANCY.

DR. WALTON MARTIN presented a woman, 24 years old, who entered St. Luke's Hospital on July 17, 1908. Three days before admission she had been seized with severe, cramp-like abdominal pain, which persisted and was so severe that on the following day she fainted. She gradually grew weaker, and when admitted to the hospital she was in a state of collapse. Since the onset of her attack there had been no movement of the bowel, and vomiting had been incessant. During the past twenty-four hours the abdomen had become distended.

Previous to this illness, the patient had enjoyed good health. Menstruation had always been regular until three months ago. Since that time there had been no regular menstruation, but she had noticed on several occasions and at irregular intervals slight bleeding from the vagina.

On examination, she was seen to be in shock, very pale, with the skin cold and clammy. The pulse was weak and rapid. The abdomen was distended and very tense; the lower abdomen was tender. On vaginal examination the cervix was soft, and the os admitted the tip of the finger. There was a feeling of fulness in the posterior fornix. The patient's temperature was 102; pulse, 140; respirations, 24. The leucocyte count was 11,300; the differential count showed 91 per cent. polynuclear cells; the hæmoglobin was 35 per cent.

The patient was immediately prepared for operation. Under ether anæsthesia the abdomen was opened in the median line, and a large quantity of dark-colored blood escaped as soon as the peritoneum was incised. The left tube was apparently normal in size and appearance at its uterine attachment, but near the ampulla a mass the size of an egg could be felt lying above the brim of the pelvis, and fixed. A loop of small intestine below this mass was flattened, while the coils above were distended. On freeing the mass and bringing it out through the wound, it was seen to be made up of the ampulla of the tube, the ovary and a bag of membrane containing a foetus. This hung from the end of the tube and had evidently compressed the loop of bowel, for on removal of the mass, gas passed into the flattened intestine. The wall of the intestine showed no evidence of interference with circulation. The tube, ovary and foetus were removed, and the abdomen closed. At the completion of the operation the patient



was in very bad condition, the pulse being 150 and very feeble. A saline intravenous infusion was given. On the following day there was a gradual improvement. Flatus was passed, and on the second day the bowels moved. From that time on her convalescence was uninterrupted, and she left the hospital on August 9, twenty-one days after the operation.

The uncommon cause of the ileus in this case, Dr. Martin said, seemed to him of sufficient interest to record.

#### THE PREVENTION OF INTESTINAL OBSTRUCTION FOLLOWING OPERATION FOR APPENDICITIS.

DR. FORBES HAWKES read a paper with the above title, for which see page 192.

DR. CHARLES L. GIBSON called attention to the fact that in some instances some antecedent condition of the patient was entirely responsible for any postoperative complication rather than the operation itself. Many of these patients gave a long-standing history of repeated attacks of appendicitis, and the postoperative obstruction might be the result of adhesions and fixation of the intestine at a point remote from the site of the operation.

Another point to which Dr. Gibson referred was that since we had learned to do away with multiple incisions and the insertion of a large amount of gauze drainage, we were less apt to get adhesions than formerly, but in spite of this fact a certain number of the cases did badly. Where a large raw surface was left and free drainage was indicated, he preferred to use a Mikulicz tampon made of heavy rubber dam, such as dentists employed. It should be suitably provided with openings and inserted into the depth of the wound and plugged with gauze. It could be left there almost indefinitely (ten days or more), the gauze only being changed, and did not cause any irritation of the intestines. He looked upon this as the most efficient method where free drainage was indicated.

DR. HAYNES said that about twelve years ago he had a peculiar postoperative experience. After an operation for the removal of pus tubes there was postoperative intestinal obstruction and the abdomen was opened a second time. The small intestines, the cæcum, and ascending colon, were distended with

gas, but the rest of the large intestine was collapsed. On drawing the ascending colon downward a kink at the hepatic flexure was straightened out, the intestinal contents began to pass through the collapsed intestine and the bowels operated through the natural passage while the patient was on the table. The obstruction seemed to be due to an exaggeration of the hepatic flexure, and after the gas once began to accumulate in the ascending colon and distend this portion of the intestine the obstruction became complete. There were no evidences of any inflammatory action at the site of the obstruction. The patient did not recover from the shock of the second operation.

In speaking of drainage, Dr. Haynes said he thought the most efficient method was to employ either a medium-sized tube, or two small ones. The flow was due not so much to capillary action as to the *vis a tergo* from the intra-abdominal pressure. All we had to do was to provide a proper vent, and the intra-abdominal pressure would do the rest. In some cases it was necessary, for the purpose of drainage, to insert a strip of gauze to the site of the pelvic wound or intestinal anastomosis or gall-bladder stump; this was left for five, seven or perhaps ten days, and its removal was then usually attended with considerable difficulty. He recalled a case where a man was shot through the stomach, and stomach contents had escaped into the great omental bursa which consequently was drained by a gauze wick. On attempting to remove this drain after about two weeks the adhesions were so firm that it was thought dangerous to persist in the usual way by twisting and loosening different parts of the gauze and the following device was utilized, which has proven to be a time- and pain-saving measure. It consisted in threading a small uterine curette over the gauze; by a rotary motion the adhesions were easily severed. After appendix operations, the speaker thought it was better to invert the stump after excision and ligation. Dr. McWilliams had shown that intestinal obstruction might follow in cases where the appendix was simply ligated and the stump removed, and the speaker thought it was better to invert the stump.

DR. L. W. HOTCHKISS said that about seven years ago he read a paper before this Society upon the subject of intestinal obstruction following acute appendicitis. In that paper he had reported three cases of his own, and some twenty cases that had

been recorded by other members. The result of that investigation confirmed the observation just made by Dr. Gibson, that in a certain number of these cases, the obstruction was due to adhesions resulting probably from the character of the infection and from other factors over which we had no control. The speaker recalled one reported case where the loop of intestine which was the seat of the obstruction had been found on the opposite side of the abdomen.

Dr. Hotchkiss said the more common use of the cigarette drain and the less frequent use of gauze packing no doubt had much to do with the diminution in the number of cases of obstruction following abdominal operations. Personally, he believed in using comparatively little drainage in appendicitis operations unless it was necessary in the presence of local necrosis or for the purpose of removing extensive exudations, and then he thought it should only be used as a temporary measure and removed as soon as possible. In inflammatory conditions about the appendix, we had often to deal with essentially a protective process, which resulted in the formation of more or less fibrinous adhesions between the adjacent coils of intestine, in the effort to wall in the infectious foci. These adhesions rendered all efforts at effective drainage futile and under these conditions, gravitation did not of course lead to the pooling of the secretions in some one dependent part of the abdomen from which they could easily be drained. As to the reintroduction of gauze drainage, the speaker said he did not feel convinced that it was a preventive of secondary abscesses in itself. Most surgeons were getting away from prolonged drainage with results that were certainly better than before. He was in favor of removing the drain at the earliest possible moment, and allowing the wound to heal. The tube or flask drain was useful in some cases, but its own presence if prolonged doubtless led to an increase in the secretions and the production of troublesome sinuses.

DR. HAWKES, in closing, said he was fully in accord with what had been said in regard to the possibility of intestinal obstruction occurring after appendicitis in spite of the most careful attention to technic. Still, there were cases in which the accident was distinctly traceable to faulty technic.

In regard to drainage, the speaker thought we could fairly conclude that we did not get actual peritoneal drainage from any

point remote from our drainage tract for more than eighteen hours after operation. Then we simply got serum from around the drain. In reply to Dr. Haynes, the speaker said he had never attached the omentum to the stump; he had simply pulled down a free piece of omentum over the stump, so that the upper part of the omentum rested on the caput coli. Personally, he had never had a case of intestinal obstruction result from that method of treating the omentum, nor had he ever inverted the stump of the appendix. He simply tied it off quite short, touched it with a little carbolic acid, and covered it with omentum when possible. A number of times he had had the opportunity to see the results of this method subsequently, and he was scarcely able to find any trace of where the stump had been.

# TRANSACTIONS

OF THE

## PHILADELPHIA ACADEMY OF SURGERY.

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*Stated Meeting, November 2, 1908.*

The President, DR. WILLIAM J. TAYLOR, in the Chair.

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### CONGENITAL DISLOCATION OF THE KNEE.

DR. JOHN B. ROBERTS said that at the meeting of the American Surgical Association on May 9, 1901, he presented a paper reporting a case of arthrotomy for congenital anterior dislocation of the tibia.<sup>1</sup> The girl, who was aged five years, was operated upon in March of that year through a large horse-shoe incision made across the front of the knee. After division of the ligament of the patella and almost complete section of the lateral ligaments of the joint the dislocation was easily reduced. A partial section of the four-headed extensor muscle of the leg was necessary in order to repair the cut ligament of the patella. Some infection of the wound occurred and it became necessary to open it and thoroughly drain the knee-joint, using also irrigation with mercuric chloride solution and subsequently with formaldehyde solution. After a number of weeks the child returned to her home with the bones in proper position, though there was still great restriction of motion at the knee-joint.

He presented illustrations showing a skiagraph and photographs of the child before operation. The photograph now presented (Fig. 1) shows the child as she is at the present time. Her physician, Dr. F. S. Nevling, reports that the child, who is a dwarf, can now use the operated leg just as well as the other and needs no brace or support for it. She can run and jump just like

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<sup>1</sup>Transactions of the American Surgical Association, 1901; and Annals of Surgery, August, 1901.

FIG. 1.



Showing result of arthrotomy for congenital dislocation of the knee at the end of seven years.





any other little girl. She is now about thirteen years old and has long since ceased to grow. The doctor thinks she is little, if any taller than when she was operated upon at the age of five. Inspection of the photograph indicates that she is probably a cretin. She has a large head and prominent abdomen. Her expression, however, is not that of a child of very defective intellection. The scar of the operation on the left knee is shown on the picture; and the legs appear to be of the same length.

She is somewhat defective mentally, but Dr. Nevling says she can care for herself and ask for everything she wants, but that she gets very cross, if not humored. The parents have treated her like a baby and have not sent her to school. The physician mentioned has advised that they send her to school, but this has never been done. The other children are normal and bright. She has two brothers of adult age who are nearly six feet tall and weigh from 160 to 180 pounds each, and two sisters aged 17 years and 19 years who are bright and weigh from 125 to 150 pounds. There is another brother older than she and one younger. The latter is now 10 years old and weighs about 90 pounds. There have been no other deformities in the family, and Dr. Nevling thinks that possibly the dislocation of the knee was caused during delivery of the mother, as she says that she had a very hard time at that particular confinement. He can give no reason for the child's ceasing to grow and being a dwarf.

#### RECURRENT ACUTE APPENDICITIS AFTER OPERATION.

DR. GEORGE G. ROSS said that to a patient who has been operated on for an acute suppurative appendicitis and whose appendix has not been removed, the possibility and danger of another attack is no small matter. The actual occurrence of such an attack is not a rarity, and these cases offer additional difficulties at the second operation and bring to both the surgeon and the patient a realization of the shortcomings of the first.

During the past three months he had operated on three such cases, all at the German Hospital. In two the occasion for a second operation was an acute attack of appendicitis, in the third the procedure was for the relief of a persistent abdominal sinus.

The details of these cases are as follows:

CASE I.—Mr. H., aged 37. On September 27, 1907, patient was taken ill with appendicitis. He was treated medically, appar-

ently improved, and at the end of the second week passed about three pints of pus by the bowel in several evacuations. His chills and evening temperature however persisted, as did the tenderness and distress in the right iliac fossa. He lost forty pounds during his illness. He was finally sent to the Hospital and on October 31, 1907, an abscess to the right of the ascending colon was opened and drained. The appendix was not searched for. The patient, after a long convalescence, made an apparent recovery. On August 23, 1908, he was admitted to the German Hospital. He complained of not feeling very well and of a tenderness at the site of the old scar, which had been present for six months. Physical examination revealed an exquisitely tender mass the size of a man's fist beneath the old scar, which had given away, leaving an incisional hernia. An incision removing the superficial scar was made, opening the peritoneum in the line of the original incision. The adherent intestines were separated from the cicatrix and a postcæcal abscess cavity opened. Within it was found a gangrenous appendix sloughed in two. The appendix was ligated and removed, the abscess cavity cleaned out and drained by a rubber tube through the loin, and gauze anteriorly. The patient made an interrupted recovery.

CASE II.—Mr. C. S., age 30, had been operated on three years before at the Bellevue Hospital, New York, for acute appendicitis. His wound was drained and he was told that his appendix had been removed. He was admitted to the German Hospital of Philadelphia, August 3, 1908.

His present illness began one week ago, when after an indiscretion in diet he had an attack of diarrhœa lasting all night. Since then he has had a desire to have his bowels move very often, yet passes but little fecal matter each time. At the same time he has had general abdominal pain. The night before admission the pain became acute and was localized to the right iliac fossa. He vomited once.

Physical examination shows the absence of rigidity or distention. There was an excessively tender mass beneath the old scar.

Operation, September, 1908: old scar excised; intestines walled off with gauze pads and a pericæcal abscess exposed; the small amount of pus found was wiped away and an inflamed necrotic appendix found, which was ligated and removed; the

abscess cavity was drained by the means of a rubber tube and gauze. Patient made an uninterrupted recovery.

CASE III.—Mr. C. G., age 24, at the end of November, 1907, was operated on for acute appendicitis. He had been ill for three days before admission and had been treated by his physician with purgatives. At the operation an abscess containing very foul pus was opened and drained. The record of the case states that a gangrenous appendix was found and removed as a slough. It is of interest in this case, that threatened obstruction from contracting adhesions was averted by repeated daily doses of castor oil.

Ever since the operation the patient has had a discharging sinus, for which he came for operation in June, 1908.

At this operation, after placing a probe within the sinus, the old scar was dissected out in the usual way and the intestinal adhesions separated. The sinus was found to communicate with the lumen of the remaining one-inch-long portion of the appendix. This inch of appendix was removed, a small drain introduced and the wound closed. The recovery was uninterrupted and did not recur.

Dr. Ross further said that a consideration of the cases cited would direct our inquiries to several points: (1) the liability to recurrence after the simple opening and drainage of an appendiceal abscess; (2) the propriety of removing the appendix in cases in which the trouble outside of the organ is marked; (3) the importance of operation before the trouble becomes extra-appendiceal.

*The Liability to Recurrence.*—There can be no doubt that as long as any portion of the appendix in communication with the cæcum remains, recurrent attacks are to be feared. Could we predict in any particular instance what the subsequent behavior of the appendix would be it would be easy for us to determine whether to be content with the simple evacuation of an abscess or to search more thoroughly for the appendix. Yet this is manifestly impossible.

Sir Frederic Treves states that of 100 cases of appendiceal abscess operations which came under his observation, 16 had recurrences and 8 subsequently had the formation of inflammatory exudates in the right iliac fossa, no doubt appendiceal in origin—24 per cent. then really had recurrences after operation.

And while this distinguished author states that of 100 patients operated on by simple drainage of the abscess 84 did not have recurrence, I would reverse this method of presenting the facts and emphasize the point that 16 per cent. to 24 per cent. did have recurrence.

Nor can any given patient, under such circumstances, be sure at any time, however remote, that he will not again be the victim of an attack of appendicitis. It is almost impossible for us to calculate the hindrance that such a constant apprehension must be.

It is only in those cases in which the appendix has sloughed, disintegrated and really become a portion of the abscess mass that a recurrence is unlikely, and these, unfortunately, we are unable to recognize at operation unless one searches for the cæcum to locate the origin of the appendix. Twice in making such a search I have discovered a hole in the cæcum where the appendix had sloughed off. Several times in making a search for the appendix, unsuspected, isolated collections of pus have been discovered.

Nor is it necessary for the whole appendix to be present for us to have a re-awakening of the old trouble. Instances have been reported of cysts and infections of appendiceal stumps and Treves in his series of 100 cases found two in which subsequent trouble was due to pus formation in a mere stump of an appendix.

The leaving of such a portion of the appendix may occur in two ways:

1. The operator may do this by faulty technic. This is doubtless a rare occurrence, particularly at the hands of any one who has had the benefit of observation before attempting to operate.

2. After opening an appendiceal abscess the sloughed appendix may be removed and a portion inadvertently be left. This would also seem not likely to occur, yet Case III is an illustration of this.

On the other hand while the distal end of the appendix may be comparatively free, the proximal may be a portion of an abscess wall which the operator does not wish to disturb.

Should the appendix be already sloughed off an examination of the cæcum will often reveal the fact that the line of separation is some distance removed from the junction of the cæcum and the appendix and that therefore a considerable stump is left, which must be removed.

This was the case in an instance encountered recently by a colleague, Dr. Whiting. In a case which he operated on the thirteenth day of the attack, the entire distal end of the appendix was a slough, a whitish string almost, while a distinct stump was left, the lumen being closed by healing that had already taken place.

As regards such spontaneously healed appendiceal segments we know that they can also remain harmless and retain their nourishment for indefinite periods and that their reinfection and inflammation gives rise to attacks and lesions entirely similar to an acute appendicitis.

Williams (*Brit. Med. Journ.*, 1907) has lately cited the curious instance of acute inflammation in an appendix entirely separated from the cæcum, causing a typical appendicitis.

The lesions which we may expect from the remnant of the appendix, or rather the pathological processes to which it may give rise, may be classed as follows: (1) acute appendicitis, with or without abscess; (2) continuation of primary infection or residual abscess; (3) fistula.

An appendix left at operation for abscess is somewhat less liable to give another attack of appendicitis than one left unoperated in a mild attack. Yet the possibility is not remote. As might be expected in cases where there has already been so much damage to the structures of the right iliac fossa, abscess formation in these cases is common. Case II is an example of this class. Here a man, in good health for three years after an appendix operation, becomes subject to another very acute attack with abscess formation.

A residual infection, or one in which there has probably never been an entire subsidence of the infection about the appendix, and a gradual abscess formation takes place as shown in Case I. As to symptomatology they furnish us with a picture of slow abscess formation with mild infection as opposed to the acute signs as in cases of class 2. As to pathological conditions within the abdomen, and their treatment, they furnish us with nothing that varies from those of the first class.

In class 3, the fistula cases, we may really have two varieties: (a) those in which the appendix portion or stump acts solely as an irritant in keeping open a sinus tract; (b) those in which the sinus communicates with the lumen of the appendix, either of the

appendix proper or of a sloughed segment, as in a case reported by Dr. Deaver.

It is not always possible to ascertain when the appendix is the underlying cause of the persistence of a sinus. Should we be able to exclude the possibility of the presence of a portion of ligature, etc., it will be probable that the fistula either arises from the stump of the appendix or is kept active by the presence of a fecal concretion, etc. It is but in a few instances that we see a sinus or fistula of long standing in which at operation some such cause is not demonstrable.

The treatment of such recurrent infections, residual abscesses, or fistulæ, is based upon one general principle, viz., to remove the primary cause of the trouble and to repair the damage done by it.

To leave the appendix a second time in abscess cases would be only to invite another attack and the formation of another abscess with a continuation of local infections finally leading to a general infection.

But far more important than the treatment of these conditions is the question of their avoidance at the primary operation. It is known that they occur after abscess or pus cases. The question then arises: What is the proper operative treatment for appendicitis and abscess?

The treatment of appendiceal abscess cases must have been carefully considered by every one who has had occasion to deal with a number of these cases.

Authorities have differed greatly as to the mode of approach, the method of incision and of drainage and the after treatment. Equally have they differed as to the method of dealing with the appendix in these cases.

Amongst many surgeons the simple evacuation of an appendiceal abscess is held to fulfil all the indications in such a case, and that the treatment of a case is such as would be applied to a simple abscess anywhere in the body. This is a method of treatment much more in vogue upon the continent of Europe and especially in Germany than among American and English surgeons. Mr. Bottle has recently advocated secondary operation for the removal of the organ before the patient passes out of the surgeon's hands.

Others, such as Dr. Morris, of New York, speak for the removal of the appendix in every case regardless of its location or relationship to the abscess wall, etc.



The large majority of surgeons heretofore, however, have taken the position held by Dr. Deaver,—that it is advisable to remove the appendix whenever it is not so situated in the wall of an abscess that to remove it would be to spread infection over the general peritoneal cavity.

As will be seen the meaning of this statement varies largely with the surgeon applying it. In the opinion of the reporter the incision and drainage of an appendiceal abscess represents the most unsatisfactory of all operations for acute appendicitis. To operate upon a resultant pathological condition and leave the original focus and cause of infection *in situ* is opposed to all the fundamental principles of surgery.

A primary incision with secondary operation for the removal of the appendix is no less unsatisfactory. As a rule patients cannot be induced to return when they are feeling well even if they know that they may at any time become most gravely ill. This method also exposes the patient twice to anæsthesia and the discomfort and inconvenience of operation. Not only this but a second operation shows us instead of a free appendix or one covered by fresh adhesions, easily loosened, an appendix hidden and covered by adhesions often so dense that the removal of the organ becomes a surgical procedure of the greatest difficulty and danger.

A decision must be made, between those who would always remove the appendix, and those who advise its removal as a rule but do not regard its remaining as a serious matter.

He was not willing to say that the appendix should be removed in absolutely every case. But his experience with these recurrent cases that he had himself operated, and others that had come under his observation, leads him to believe that the cases in which the appendix should not be removed are rare indeed. Surgeons have been too fearful of hunting for the appendix in the presence of small amounts of pus, too prone to hesitate in removing it from among adhesions or from the limiting membrane of an abscess.

The leaving of the appendix in an acute abscess case is a serious matter. Such an incomplete procedure simply tides the patient over the acute condition and one should not be satisfied until the offending organ is in a bottle of alcohol. Until this happy event takes place the patient remains in a condition of no uncertain danger.



He had left an appendix in but one case for two years and had not lost one of these cases as a direct result of the removal.

But one other point remains,—instead of reoperating in abscess cases, surgeons should not have to operate on abscess cases at all. A case of appendicitis, diagnosed and operated early, cannot give rise to a fraction of the complications that delay brings with it. Operation should follow diagnosis at once and there would result clean cases, without drainage, mortality or complications.

Unfortunately we seem to be far from this happy state of affairs. Sometimes it seems as if we were still in the pre-surgical stage, when the evacuation of an appendiceal abscess into the intestines, as in one of these cases, was esteemed a most fortunate result.

To the average layman the word appendicitis is spelled OPERATION. Where then lies the fault for the large percentage of appendiceal abscesses still encountered?

Of 194 cases of acute appendicitis on the records filed so far this year, January to September inclusive, at the German Hospital but 79 or 40 per cent., were clean *i.e.*, early cases.

Of 23 cases that he operated there during the summer but 10 were clean cases that could be closed without drainage.

Since January 1, 1907, he had operated 161 cases of appendicitis,—100 at the German Hospital, 56 at the Germantown Hospital, and 5 at other institutions. Of these, 105 were clean cases which were closed without drainage, this included both chronic and acute cases. There was one death. The patient was a Jew and had, in addition to his appendix troubles, enlargement of the lymphatic glands of the mesenteric chain as far as the finger could reach. After operation he was extremely restless, became actively delirious and died promptly of exhaustion. A partial postmortem revealed nothing about the seat of operation to account for death. The glands were not malignant, probably tubercular.

Fifty-six cases required drainage for pus, either in localized collection or involving the entire peritoneal cavity.

So far as he could recall, or the records state, there was but one case in which the appendix was not removed. This man had been operated a year before at the Bellevue Hospital, N. Y., and reported at the German Hospital, September, 1907, with a sharply outlined abscess in the right iliac fossa, which was opened

extraperitoneally by an incision parallel to and above Poupart's ligament. He recovered and was discharged nineteen days later.

Three died,—two of these had general peritonitis and sepsis which was very profound before operation and which did not improve, one of these died in the operating room of acute septic œdema of the lungs, the other had had intestinal obstruction for four days before admission. The third case was one of localized abscess presenting in the median line. The pressure of the collection had caused complete occlusion of the rectum. The surroundings of the abscess were necrotic from pressure necrosis. The patient had been ill for two weeks.

As far as could be traced the three cases of peritonitis were infections of the retroperitoneal space. Total mortality, 2.4 per cent.; non-drainage cases, 0.9 per cent.; drainage cases, including general peritonitis, 5.3 per cent.

DR. JOHN H. JOPSON mentioned three cases of this kind operated within a few months of each other. One case was a patient Dr. Wharton operated upon, with the assistance of Dr. Jopson, the other two cases were his own. These three cases emphasized the necessity of removing the appendix in all cases of abscess. He could recall only two cases in recent years where he could not remove the appendix. In one a careful examination of the cæcum showed it sloughed off, and in the other it could not be found. In one of his own cases the child had had an operation for drainage of an appendiceal abscess a year or two previous, then had a second abscess at the time the appendix was removed, and a third abscess after removal of the appendix.

It always seemed to him that to open an abscess and leave the appendix was a very unsatisfactory procedure and incomplete surgery. It had frequently been his experience when removing the appendix where there was an abscess, to find fresh pockets of pus behind and around it.

One hears much less advice now in favor of leaving an appendix which "forms part of the abscess wall." It is much less dangerous to remove such an appendix, after careful protection of the uninvolved peritoneum, than to leave it and run the risk of overlooking other purulent collections.

## AMPUTATION AT THE SHOULDER-JOINT FOR EMPHYSEMATOUS ("TRAUMATIC") GANGRENE.

DR. ASTLEY P. C. ASHHURST reported the case of Laurence S., aged 14 years, who walked into the receiving ward of the Episcopal Hospital on December 27, 1907. While at his usual work in a yarn factory he had caught his right arm in the machinery, and had had the skin squeezed off it from just above the elbow to above the wrist, by the revolution of two rollers. The skin hung loose like the inverted sleeve of a coat. A somewhat similar case, in which the skin had been squeezed off the hand from the wrist to the fingers, had recently been under treatment in the hospital, and as a considerable portion of this hand had been saved by conservative measures, the Resident Surgeon determined to attempt to save this second patient's arm. Accordingly, after thorough cleansing of the parts, the skin was stitched in place, leaving ample spaces for drainage through various rents in the tissues. The arm was surrounded with hot water bottles. It was considered barely possible, as the deeper structures were not injured, that some degree of union might take place, and that amputation, if it had to be done eventually, might be done through the forearm, and not at the middle of the humerus, as would have been necessary had it been done on admission.

The patient did well for twenty-four hours, when his temperature rose abruptly to 102° F., his pulse however not exceeding 104 per minute. On the third day after admission, at the morning dressing, a little emphysema was noticed in the forearm. The temperature had fallen to 100° F. The patient was isolated by direction of Dr. Frazier. When seen by Dr. Ashhurst in the afternoon, the emphysema had spread, and he urged amputation below the shoulder. Consent of the family could not be obtained, however; and in accordance with the advice of Dr. Neilson, the sutures were all cut, and the limb was placed under constant irrigation, this being the only form of palliative treatment that seemed available. Free incisions were also made throughout the emphysematous tissues, thus relieving the patient's pain, and giving exit to quantities of frothy fluid. A culture was made from this fluid, and it was found that an air-producing bacillus was present; but unfortunately, owing to changes in the laboratory, the culture was mislaid before it was possible to determine whether the growth was due to the bacillus of malignant œdema,

to the *Bacillus aërogenes capsulatus*, or to some other gas-producing micro-organism.

The next morning, December 30, the patient appeared better, and the local condition was no worse: the fingers were absolutely gangrenous, and the whole forearm, as well as the elbow, was numb. The temperature was 100° F., and the pulse 90 to 100, rather weak, and very irregular. The patient was clear in his head, as on the previous days, and did not present the aspect of one who was seriously ill. The accompanying photograph (Fig. 2), made on this date, shows the appearance of the arm. As the emphysema had not spread toward the trunk, being sharply limited by the circular wound above the elbow, where the skin had been torn loose, it was considered safe to postpone amputation, in the hope that a line of demarcation might form. As a matter of fact, the next day, December 31, there was a suggestion of a line of demarcation at the border of the skin surface above the circular slough in the lower third of the upper arm. The notes for this day read: "Forearm is emphysematous and gangrenous. Gangrenous process does not appear to pass beyond point of sutures at elbow. Several incisions made in forearm to liberate gas and fluid. Upper arm is discolored for about two inches above line of incisions. General condition good. Pulse is irregular and slow, but of good volume." The pulse, on this and the preceding day, varied from 52 to 94 per minute. No digitalis had been given.

On the morning of January 1, 1908, it is noted that "there is slight crepitation for about one inch above line of suturing, and the discoloration seems to have spread nearer the shoulder, the upper arm is somewhat more swollen. Pulse irregular and not so strong." The temperature was just below 98° F., and the pulse from 64 to 68 per minute.

As it was evident that the infection by the gas bacillus had crossed the barrier set up by the solution in continuity of the skin and subcutaneous tissues, produced by the original injury in the lower third of the upper arm, amputation was decided upon at once. It was found that the inner surface of the arm almost to the fold of the axilla was greenish in hue, and that the only region from which a flap could be obtained was the deltoid; accordingly amputation at the shoulder joint was done by Dupuytren's method, using Wyeth's pins and an Esmarch band for

hæmostasis, cutting the deltoid flap from without inward, and the inner, short flap, from within outward, after disarticulating the humerus at the shoulder. A large rubber tube was left in the stump for drainage, and the flaps were not sutured tightly. The patient was much shocked, though only a few drachms of blood had been lost, and the operation had been completed with reasonable speed (about 25 minutes).

After the amputation the patient's temperature rose in a few hours to over  $103^{\circ}$  F., and by 4 A.M. the next morning reached  $105.6^{\circ}$  F., his pulse being about 138-148. At 4.30 A.M. he was given one pint and a half of saline solution, intravenously. This somewhat improved the force of his pulse. From the time the boy came out of ether, on the afternoon of January 1, to the morning of January 5, he suffered from the most frightful and violent traumatic delirium: he shrieked and yelled constantly, acting over and over again in his delirium the scenes of his accident, and throwing himself around on the bed so vehemently that he was with difficulty kept off the floor, even by strapping his ankles to the bed, and fastening his body by a sheet. During the first 72 hours succeeding the operation he obtained only six and one-half hours sleep, in two periods of about three hours each, in spite of the generous use of morphine, chloral, and hyoscine. Finally on the night of January 4, after a dose of paraldehyde, but perhaps merely as a result of exhaustion, he slept seven hours and a half, and awoke the next morning clear in his head. His temperature had gradually fallen, and after this date did not rise above  $100^{\circ}$  F.

The wound was dressed on the second day after the operation, to make sure that the gangrene had not affected the flaps; fortunately these were found in excellent condition.

To combat the toxæmia which seemed to be the cause of his delirium, he was forced to take as much liquid diet as possible. On the day after the operation, only 16 ounces of liquid nourishment could be taken, but this was supplemented by giving him a pint and a half of saline solution intravenously, as already mentioned. On the second day he took by mouth 68 ounces of fluid; and on the third day 65 ounces. No doubt it would have been beneficial to administer more saline solution intravenously, or by hypodermoclysis, but his delirium and tossing were so absolutely uncontrollable, that it would have been impossible to do either without the administration of a general anæsthetic. No record

FIG 2.



Emphysematous gangrene.

FIG. 3.



Amputation at shoulder joint for emphysematous gangrene.



could be kept of the amounts of urine excreted, as these, as well as his bowel movements, were passed in the bed.

Two days after he came to his senses, he was removed from isolation, and returned to the general ward. His recovery henceforth was uneventful. A photograph made four weeks after operation, shows the appearance of the stump (Fig. 3).

This case is deemed worthy of record because of the rarity of recovery from emphysematous gangrene, even after prompt amputation. Although a case of this form of gangrene is received at the Episcopal Hospital every few years, this is, so far as can be determined, the first case to recover. In 1902, a man was admitted to the service of Dr. Neilson with compound fracture of the left elbow-joint; one morning, a few days after his admission, he was found to have developed emphysematous areas in his arm above the elbow. Three or four hours later, when seen by Dr. Neilson, the emphysematous crackling had invaded the thorax, and all thought of operation was abandoned, the patient dying the same afternoon or evening. In the summer of 1907, a patient who had been operated on for typhoid perforation, in Dr. Deaver's service, developed emphysematous gangrene in the abdominal wound, and died in a few hours.

Dudgeon and Sargent (*Trans. Pathol. Soc.*, London, 1905, lvi, 42) refer to two cases of emphysematous gangrene due to the *Bacillus aërogenes capsulatus*, following crushes, both patients recovering after amputation. Gayet (*Revue de Chir.*, 1908, i, 575) has recently reported the case of a patient with compound fracture of the forearm, which was repaired by operation, and who developed "benign gaseous gangrene," but recovered without amputation in three months and a half.

Writers in general recognize two main forms of "traumatic" or spreading gangrene ("*gangrène foudroyant*")—the more serious form of malignant oedema, caused by Koch's *Bacillus*, in which variety the formation of gases is a secondary and minor characteristic; and a less serious form, due to any one of a number of gas-producing micro-organisms, of which that most frequently encountered is the *Bacillus aërogenes capsulatus* of Welch. Among other bacteria which may be the cause of emphysematous gangrene, Freeman ("*Keen's Surgery*," Phila., 1906, vol. i, p. 340) mentions the *Bacillus proteus vulgaris*, *Bacterium pseudo-oedematis maligni*, and the *Bacterium coli commune*.

The infection in the present case was probably due to one of the less malignant bacteria; and it seems not impossible that the delay in the emphysematous gangrene spreading toward the trunk may have been due to the form of the injury, which ripped the skin and subcutaneous tissues from around the arm above the elbow, thus leaving a gap in the lymphatic and cellular tissues between the infected and healthy parts, which completely encircled the limb, and prevented extension of the infection upward.

The slowness of the pulse (52 to 64), and the absence of local inflammatory reaction before the operation, are also noteworthy. These features, as well as the fact that emphysema developed before the parts became gangrenous, show that the condition was not one merely of putrefaction in already mortified tissues; a fact which is further testified to by the finding of gas-producing bacilli in the fluids of the part, before the gangrene itself was evident.

Dr. Ashhurst expressed his indebtedness to his chiefs, Dr. Chas. H. Frazier, and Dr. G. G. Davis, in whose services the patient was treated, for the privilege of operating, and of reporting the patient's history.

#### TEMPORARY PARALYSIS OF LEFT VOCAL CORD AFTER EXCISION OF TUBERCULOUS CERVICAL LYMPH-NODES.

DR. ASHHURST also reported the case of Frank J. S., aged four years, who was admitted to the Children's Hospital on July 28, 1908, in the service of Dr. E. B. Hodge, Jr., to whom he was indebted for the privilege of operating and of reporting the operation. In February, 1908, this patient had had his tonsils removed at the Children's Hospital by Dr. F. R. Packard, and shortly afterward developed measles, on account of which he was sent home. During his convalescence from the measles the lymph-nodes in the left submaxillary region became enlarged, and in spite of palliative treatment the swelling persisted. When he returned to the hospital in July, there was a firm, nodular mass in the left submaxillary region, the size of a goose egg, seven or eight more or less fused nodes being palpable through the skin. Operation was undertaken July 30, 1908. Through Dowd's incision parallel with the border of the mandible, and about an inch below it, the mass of lymph-nodes was removed entire: they surrounded the great vessels for a distance of about two inches and a half, a distinct groove being left in the specimen where the vessels ran.

The hypoglossal nerve and descendens hypoglossi had to be dissected out of the inflammatory mass, and in so doing profuse hemorrhage arose, thought to be from a puncture of the internal jugular vein. The bleeding vein was clamped, but as the hemorrhage was then seen to come from a longitudinal slit, and not from a mere puncture of the vein, it was impossible to apply a ligature satisfactorily, so the rent in the vein was sutured with fine chromic catgut. When the hemorrhage had thus been effectually stopped, it was seen that the tear had not been in the internal jugular itself, but in the temporomaxillary vein close to the trunk of the jugular; as part of the mass of lymph-nodes lay below this vein, it was accordingly ligated in two places and divided between the ligatures, in order to facilitate the operation. The deep fascia was closed with buried sutures of chromic gut, and the skin with silk-worm gut, a small gauze wick being inserted for drainage. The duration of the operation was one hour.

As the child had shrieked continuously for fifteen minutes before the anæsthetic was started, it was without much surprise that he was noticed to be very hoarse the next day. But as this hoarseness persisted with no appreciable diminution for two weeks, it was considered wise to have a laryngoscopical examination made, as it was feared the superior laryngeal nerve had been injured. Dr. Packard very kindly examined the child's larynx, and reported as follows: "I only saw him once and it was pretty hard to make an accurate diagnosis as he was very nervous. I thought at the time that there was a partial paralysis of the vocal cord on the side upon which the operation had been performed, and which I attributed to injury of the recurrent laryngeal nerve. Of course, if his superior laryngeal had been injured there would have been loss of sensation in the laryngeal mucous membrane, and the paralysis in such cases is never quite as marked as it appeared to be in the case which I examined. I have seen at least one other case of this kind, in an adult who had had tubercular cervical glands removed from her neck, following which she developed hoarseness and the vocal cord on the side which was operated upon was in a cadaveric condition. She regained the use of her voice completely. I think in these cases the recurrent laryngeal must be injured by being pulled upon or pressed, and as it is not completely severed, it recovers spontaneously after a greater or less lapse of time."

The hoarseness gradually diminished, and eventually disappeared completely, as did the slight facial paralysis present immediately after the operation.

If the injury had been to the recurrent laryngeal nerve, it seems certain that it must have been produced indirectly, by pulling upon the trunk of the vagus while dissecting the lymph-nodes off the great vessels; if the paralysis of the vocal cord was not due to injury of the fibres of the recurrent laryngeal nerve, then it must have been caused by injury to the superior laryngeal, which supplies the cricothyroid muscle and through stimulation of this muscle elongates the vocal cord of the same side, by elevating the anterior border and depressing the posterior border of the cricoid cartilage.

#### ACUTE PANCREATITIS.

DR. JOHN B. DEEVER presented the following case history: Male, age 27 years. One year before admission to hospital had four or five attacks of abdominal pain accompanied by jaundice.

Two and a half weeks before admission had severe attack of epigastric pain accompanied by nausea and vomiting. Pain continued to day of admission, with frequent exacerbations. Pain started in epigastrium, referred to lower abdomen, back and shoulders. Has been jaundiced more or less ever since onset of this attack.

*Physical Examination.*—Patient is jaundiced, the respiratory excursions are limited, the respirations are short. Liver extends from the sixth interspace to two finger-breadths below the costal margin in the mammillary line. There is slight epigastric fulness and spasticity of both recti muscles. Some tenderness over entire epigastrium, quite marked over Mayo Robson's point. The pain continued without relief up to the time of operation. Temperature on admission  $98.4^{\circ}$ , and, during entire course of illness, febrile for only about three days after operation, with a maximum of  $100.4^{\circ}$ .

*Operation.*—Incision through right rectus. The gall-bladder was found adherent to colon and omentum and contained calculi. Posterior to the stomach there was a soft, fluctuating mass about the size of two fists, pushing the stomach forward. The finger placed in the foramen of Winslow found this to be in the position of the pancreas. The gall-bladder was walled off with gauze pads and aspirated. Forty cubic centimetres of mucopurulent fluid

were removed. This was sterile, as shown by culture. The gall-bladder was then incised and four large and twenty-four small stones were removed from it and the cystic duct, which was dilated. Tube drainage was introduced into the gall-bladder and the gall-bladder sewn to the parietal peritoneum. The choledochus was patulous. The laparotomy wound was closed after placing a gauze drain in the subhepatic space.

The patient was then placed on his right side and an incision made in the left loin, extending down 7 cm. from the costal margin and just external to the outer border of the erector spinæ. In the fatty capsule of the kidney there was much fat necrosis. An abscess was evacuated in the location of the pancreas and about half a litre of bloody purulent fluid escaped. The cavity was drained with a large rubber tube and two pieces of gauze.

The patient made an uneventful and practically afebrile recovery. The drain was left in the gall-bladder eleven days, and in the posterior incision for several weeks, although the drainage gauze in this incision was all removed in six days. The discharge from this wound was found to be very irritating to the skin.

Dr. Deaver remarked that this case presented these points of interest: (1) The slow pulse and afebrile course; (2) the presence of biliary calculi,—for which the operation was performed; (3) the presence of fat necrosis in the abscess cavity; (4) the irritating character of the pancreatic discharge.

#### THE VALUE OF THE CAMMIDGE REACTION IN THE DIAGNOSIS OF PANCREATIC DISEASE.

DR. EDWARD H. GOODMAN read a paper with the above title, for which see page 183.

DR. JOHN H. MUSSER (by invitation) said that in the main he agreed with the writer, feeling that there is in this test a symptom or sign of great significance in the diagnosis of pancreatic disease. In the previous reactions as described by Cambridge, however, he had felt that there was very little of satisfaction, and he had so reported at the Association of Physicians a few years ago. There were good chemical reasons for one to feel that perhaps the reactions were artificial rather than arising from the occurrence of any pancreatic disease or any change in the urine the result of pancreatic disease. The C. reaction has proven much more satisfactory, however, in the few cases observed, but as Dr. Goodman has said, one must consider it only an aid, a



suggestive, but certainly not a pathognomonic, sign in pancreatic disease.

He had just recently put on record nine cases of acute pancreatitis. Four had been under the care of surgeons and three got well. The fourth was seen very early in our studies of pancreatic disease, as long ago as 12 or 15 years, and while an abdominal section was done in the presence of the extraordinarily large accumulation of blood, it rather made the surgeon hesitate to go further than to do an exploratory operation, and in consequence—or perhaps it would have happened anyway—the patient died. In the present time more heroic measures might have been carried out and the patient's life been saved. Of the five remaining cases three died and two got well, so that a person with pancreatic disease may get well without surgery, and therefore one must consider that acute pancreatic disease is in part,—that is up to a certain degree,—a medical affection, but the time comes very soon when it is a surgical disease. That borderland, so far as known at the present time, is not so distinct as one would like to have it, but it cannot really be said that in every case of pancreatitis an operation should be done, and perhaps more particularly not because of the pancreatitis but because of the associated features in connection with the various cases. Pancreatitis is more frequently seen in patients past 50 or 60, who have other lesions, particularly degenerative lesions of the heart and blood-vessels, which may prevent operative interference. Under such circumstances perhaps life is not in quite as much peril as if operation were resorted to. In his experience the patients who got well were both young subjects; for the patient who died, an autopsy confirmed the diagnosis of pancreatitis. It is not an easy matter to make a diagnosis of pancreatic disease in acute pancreatitis. Of the nine cases mentioned five were women, four men, and five of the number were over 50 years of age.

DR. WILLIAM L. RODMAN said that this test of Cammidge had been too long neglected by American physicians and chemists. It has been used with great advantage in England. In Leeds six years ago Robson and Moynihan spoke optimistically of this test in pancreatic disease and cholelithiasis. Neither liked to do an operation without the opinion of Mr. Cammidge, and both have reported, at that time and subsequently, that he was almost invariably right. He did not know why it was that the test had not

been more satisfactory in this country, unless perhaps it was due to the fact that it is such a complicated procedure and requires a skilful technic in order to obtain results. It is certain that in the right hands and made in the right way it is a good test. The experience he had had with the test led him to believe that it was most valuable. Of course, it may not be a pathognomonic sign, but that it is a really substantial aid in cholelithiasis and in pancreatic disease there was not the slightest doubt. The test is not apt to be positive in carcinomatous pancreatitis. It is in chronic pancreatitis that it finds its best field of usefulness.

DR. JOHN B. DEEVER, in closing, said that he was inclined to take the same view that Dr. Goodman had brought out in his paper. He agreed with Dr. Musser entirely when he speaks of a case of acute pancreatitis as being medical in the beginning of the attack. He also agreed with him as to the difficulty of diagnosis in the great majority of these cases, and certainly he felt that this test should be made, at any rate before operative interference was resorted to, particularly in acute pancreatitis. His experience in acute pancreatitis,—and he had seen a number of cases,—was that one should not be in too great a hurry to open the abdominal cavity. In cases where he had had the best results he had operated posteriorly, and this is what he proposed doing in the future if he could locate the lesion.

#### THE VALUE OF OPERATING IN TWO STAGES IN STRANGULATED HERNIA WITH THREATENED GANGRENOUS PERFORATION.

DR. JOHN B. ROBERTS said that inspection of the intestine after opening the sac of a strangulated hernia sometimes leaves the surgeon in doubt as to the wisdom of returning to the abdomen a coil, upon which there are dark spots suggesting approaching gangrene. This is not an infrequent occurrence after exposing to view a portion of gut, which has been tightly constricted by Gimbernat's ligament in femoral hernia.

Resection of the suspicious area or the formation of an artificial anus at the time the kelotomy is done are eminently proper procedures, when there is no doubt of the impending death of portions of the wall of the gut. Pushing the suspected part of bowel just within the inner ring of the hernial canal and providing for drainage have often been used.



A year ago he operated with local anæsthesia upon an old woman in feeble health with a tightly strangulated femoral hernia. He found a black line running around the gut where the ligament of Gimbernat had exercised linear pressure. The general condition of the patient and the suspicious character of this dark line made him doubtful as to what was the safest procedure. Resection seemed a serious risk and to replace the gut without waiting for more definite knowledge of the extent of damage appeared unwise. He finally concluded to allow the intestine which had been relieved of constriction to hang out of the wound. It was covered with a sterile dressing with the idea that in a day or two, he would know definitely whether or not perforation would take place from devitalization. The result justified this action; for a day or two afterwards the healthy condition of the exposed loop showed that all danger of gangrenous perforation had passed. He then, without general anæsthesia, loosened up the plastic adhesions which were easily broken and reduced the hernia. The wound was then closed and the patient made a prompt recovery.

It is likely that many surgeons have acted in this way under similar circumstances, but he had never done so, being willing in other cases to finish the kelotomy in one stage.

#### THE RELATIVE MERITS OF SUPRAPUBIC AND PERINEAL PROSTATECTOMY.

DR. JOHN B. DEEVER presented three specimens of prostate glands recently taken out, the smallest of which was removed for a chronic prostatitis with persistent urethrovesical catarrh, and the two larger for obstruction, both of which were of the soft adenomatous type. The larger of the prostates weighed 9 ounces, and was the largest gland he had ever taken out. Both of the patients were 80 years of age; they were both sitting up in bed on the fourth day after operation.

The points he wished to raise for discussion were the following: That the suprapubic method is the method of choice in large adenomatous prostates under all circumstances; that the small adenomatous, as well as the hard prostates, be they fibrous, tubercular, carcinomatous, or sarcomatous, are possibly best attacked by the perineum, the so-called Young operation; that greater damage to the bladder results from the infrapubic removal of the

prostate in large adenomatous prostates (and the hard prostate where the sheath of the gland is closely adherent); that the rectum is more likely to be injured in the infrapubic operation; that a permanent fistula, urinary incontinence and secondary hemorrhage are more likely to follow the infrapubic operation.

When secondary hemorrhage occurs after the infrapubic operation, the control of which entails packing the perineal wound, urinary incontinence and fistula are greatly favored. The primary bleeding, while it is greater in some cases in the suprapubic operation, it is more easily arrested by packing the cavity made by removal of the gland, and particularly purse-stringing with a catgut suture the mucous membrane around the opening of the cavity. Secondary hemorrhage seldom occurs following the suprapubic, while this cannot be said to be the case in the infrapubic operation. Though the prostatic urethra is destroyed in the majority, if not in nearly all suprapubic operations, the ultimate result is as good as when the urethra is saved. The one thing however in favor of leaving the prostatic urethra is the lessened chance of stricture following. That stricture follows both the suprapubic and the infrapubic method in a percentage of cases is true. The question of preserving the ejaculatory ducts in the large adenomatous prostates, occurring as they do at an advanced time of life, to his mind cuts no figure. Again, he deemed it better practice to remove the adenomatous gland entire than to leave the portion forming the floor of the prostatic urethra on account of the likelihood of recurrence of obstruction from increased growth.

That the power of voiding urine occurs as early in the suprapubic as in the infrapubic is quite true. That the infrapubic operation calls for a master hand, if it is to be carried out with the least amount of risk to the surrounding structures he admitted to be so, but in either operation the more expert the operator the better must be the results. That the mortality of the two operations is practically the same in equally good hands is true; providing the statistics are honestly made and not doctored. That the ultimate comfort of the patient is greater following the suprapubic method in the class of cases he regarded as fitted for it, he was sure was so. He had done a sufficient number of operations by both routes to convince him that he was correct in making this statement.

That the chief factors in the mortality following either operation in advanced life are governed by the functioning ability of the kidneys and especially the great care and judgment in the after-treatment, he knew to be so.

One of the most important symptoms in connection with enlargement of the prostate, and fortunately comparatively rare, is free hemorrhage. Free bleeding endangers the life of the patient from retention and clotting in the bladder, which can only be thoroughly emptied by suprapubic incision. It was his experience that the danger to life under these conditions is greater than the operation of suprapubic prostatectomy under favorable circumstances. He had known patients to loose as much as one pint of blood at a urination. A repetition of the loss of this amount of blood demands at least that prostatectomy be seriously considered.

The infrapubic removal of the prostate in some of the cases of gonorrhoeal chronic prostatitis and vesico-urethral infection is the only thing that offers permanent relief. This will not be disputed by those who have had much experience with this troublesome class of cases and with the operation under these conditions. He protested, however, against the indiscriminate selection of these cases, and wished to warn the young surgeon of the responsibility he assumed when advising the removal of the prostate in this type of cases. Further, he never performed this operation without having told the patient of the risk of injury to the ejaculatory ducts; this should not occur, however, yet that it can occur is true.

## BOOK REVIEWS.

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DISEASES OF THE BREAST, with Special Reference to Cancer. By WILLIAM L. RODMAN, M.D., LL.D., Professor of Surgery in the Medico-Chirurgical College of Philadelphia. P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia, 1908.

The present treatise forms a connecting link between our present-day knowledge of it and the works of Cooper and Gross on this subject. Although the author's own opinions are expressed most positively, due consideration has been given to those of other well-known operators and investigators, as is indicated by continual references. The literature of the subject has been very exhaustively reviewed. Statistical investigations seem to have been accorded a most careful review, and the results derived from the compilation of the reports of many hospitals give the author opportunity to draw conclusions from a much larger number of cases than any that have been published hitherto, and are in some instances at variance with those which are usually accepted. Thus, for example, a study of a large number of cases of tumor shows that benign growths are more frequent than they have been supposed to be; and, again, that sarcoma is less frequent. The more important of these statistics are shown graphically in order that the relative frequency, age, incidence, etc., of various neoplasms can be seen more readily without having to refer to the text.

Carcinoma, as might naturally be supposed, is given the greatest amount of consideration; its pathology, symptoms, diagnosis, prognosis and treatment are very fully and analytically discussed, and throughout one is impressed continually with the strong plea which the author makes for early and radical operative interference, stating quite positively that such treatment will offer a cure of the disease in a large number of cases. The most approved operative procedures are described in detail and the relative value of each discussed, the successive steps of the opera-

tion being plainly portrayed in numerous illustrations. The author's technic is shown in ten full-page plates.

The author states that when a carcinomatous tumor is situated in the upper hemisphere it is his custom to make a supraclavicular incision and to explore the posterior triangle of the neck. And, again, on page 296, he states that the chain of lymphatic vessels passes from the breast over the clavicle to empty into glands in the posterior cervical triangle. The importance of the subject would perhaps have warranted some more specific and detailed directions on this head. Attention might well be directed to the fact that there is a distinct set of vessels draining the upper part of the breast, which passes over the clavicle into the supraclavicular glands; also that there is a subclavian channel given off from the posterior surface of the mamma, which, after perforating the pectoralis major, runs between this muscle and the pectoris minor to empty into the subclavian glands; the former are situated for the most part in the supraclavicular triangle—or, as it is possibly better called, the subclavian triangle—bearing also an intimate relation to the sternocleidomastoid muscle, and, further, have tributaries extending to the apex of the anterior triangle, particularly in its inferior carotid or muscular section. Thus in removing any traces of metastasis, the lymphatic chain which bears an intimate relation to the subclavian vein, and those which are in relation to the sternocleidomastoid muscle, and, again, those which are found in the lower portion of the anterior triangle, should also be sought for and dissected out, as well as those which the author seeks in his exploration of the subclavian triangle. It is probably this that he has intended to convey in the text and that it is only the phraseology used which makes it confusing.

The inflammatory diseases of the breast, the chronic, infectious granulomata and benign neoplasms have been accorded the space which their importance deserved. Particular attention should be called to the chapter on tuberculosis and to the method of removing benign neoplasms by Warren's operation of plastic resection of the breast.

The illustrations of the book are exceptional in their number, accuracy of portrayal and beauty of execution, many being in colors which are very realistic.

DISEASES OF THE RECTUM, ANUS, AND SIGMOID COLON. By F. SWINFORD EDWARDS, F.R.C.S., Senior Surgeon to St. Mark's Hospital for Diseases of the Rectum; Surgeon to the West London Hospital, etc. Third Edition; Octavo; 442 pages; 102 illustrations. London: J. & A. Churchill, Philadelphia: P. Blakiston's Son & Co., 1908.

The last edition of this book, published sixteen years ago, had become more or less obsolete, so that a complete revision has been necessitated in order to bring it up to present-day teachings on the subjects treated. To the former work have been added chapters on the sigmoidoscope and the operative treatment of malignant disease of the rectum and sigmoid colon. The chapters on fistula, procidentia recti, sigmoidopexy and colotomy have been especially amplified. The author, in dealing with the subject of hemorrhoids, makes particular mention of the Salmon operation, it being, in his experience, the most expedient; exception, I think, may be taken by many men to this conclusion. The procedures, as described in the operative treatment of malignant disease, are, in many cases, not clear; certainly there is much more to be said on the subject than has been stated in this book.

The trend of the work impresses one as schematic, in many instances, the treatment of the various conditions being merely indicated, and not specifically stated. The book forms, as a whole, rather a review of the work of the author himself during the past thirty years, than a comprehensive review of other authorities, and may be better appreciated by the specialist than by the general practitioner, while the personal element really adds to the interest and value of the book.

A SYNOPSIS OF SURGERY. By ERNEST W. HEY GROVES. John Wright & Sons, Ltd., Bristol, 1908, pp. 486.

"Epitomes" and "synopses" are sometimes pitfalls instead of aids to the student. If they encourage him to mere memorizing they are certainly harmful. On the other hand, if they are associated with and subordinate to wider and fuller teachings, and used only as jogs to memory, not as the main source of information, they may be of great value.

With this limitation, Mr. Hey Groves' "Synopsis" is worthy of hearty commendation.



It is based on sound teachings, is systematic, and is full enough to present the salient facts of surgical practice in an orderly and convenient manner, so arranged by means of headings, type and indented margins that they can be easily and rapidly referred to.

The book gives internal evidence of having been made up, as the author states, from notes used in preparing students for examinations, but there is little to criticise. There are trifling omissions, *e.g.*, there is no description of fractures of the foot, or of its separate bones, or of fracture of the sternum; and under Potts' fracture there is no adequate mention of the common posterior subluxation; and there are a few slight errors of fact,—thus it is said that in cases of loose body in the knee-joint "locking does not occur," which is much too absolute; occasionally the English is not above reproach,—in the treatment of antral disease one method recommended is "removal of offending tooth and drainage through a metal tube inserted *into this*"; and there are a few typographic errors,—"*Fracture of Scapular*" (in index).

On the whole, however, it is a very good book, and if one were asked to name a better one of its kind and size it would be found difficult to do so.

EMERGENCY SURGERY, FOR THE GENERAL PRACTITIONER. By JOHN W. SLUSS, A.M., M.D., Professor of Anatomy, Indiana University School of Medicine. With 584 illustrations. P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia, Pa., 1908.

This book forms the fifth in a series of eight medical manuals which are to be published by P. Blakiston's Son & Company. The volume is of convenient size to be carried by the general practitioner and lends itself to this end by its flexible cover and rounded corners. It does not in any way attempt to take the place of any of the larger text-books of surgery, and does not go into various methods of operative procedure; the most approved method being usually the only one mentioned. The illustrations are profuse and instructive, particularly those illustrating the reduction of hip and shoulder dislocations. Consideration of some of the subjects cannot really be included under the head of emergency surgery; that, however, does not detract from the usefulness of the book.



## CORRESPONDENCE.

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### VAS DEFERENS ANASTOMOSIS.

EDITOR ANNALS OF SURGERY:

IN the issue of the ANNALS for November Dr. Gwilym G. Davis reports a plastic operation upon a divided vas deferens. As a further contribution to the subject, I desire to call attention to an article concerning a method of securing anastomosis of such a vas, which was published by me in the *British Medical Journal*, January 2, 1904. The following is the method I used in the case under my care:

An oblique incision was made along the course of the inguinal canal similar to that used in the operation for the radical cure of an inguinal hernia, the spermatic cord was exposed, and the testis dislodged through the wound, carrying with it a swelling the size of a large pea which was situated in the course of the spermatic cord about one inch above the testis. This turned out to be a collection of semen confined in a fascial sheath between the ends of the divided vas deferens. The vas was found to be completely divided and its ends were separated for about half an inch.

The testicular end of the vas deferens was cut obliquely by means of a cataract knife. The distal or urethral portion of the vas was split up longitudinally for about one inch; this free end was further divided up for about half an inch from its extremity so as to provide two tails of equal size; in other words, each tail consisted of one-half of the longitudinally split vas deferens. The obliquely cut free end of the testicular portion of the vas was placed with its lumen in contact with that of the testicular portion, and was fixed by means of fine silk sutures as closely applied as the whipcord-like tube would admit. The two tails of the distal end were then enveloped round the testicular portion of the vas in order to counteract the disruptive force of the weight of the testis. Afterwards layers of fascia were wrapped round the anastomosed vas deferens and fixed by sutures.

I found it necessary to form the tails in order to secure a firm and permanent approximation of the divided end. It seemed to me that end-to-end anastomosis was not practicable, owing to the smallness of the tissues for suturing. Invagination of the ends was impossible on account of the rigidity and size of the walls of the vas deferens.

One can demonstrate the practicability of the above method of anastomosis of the vas deferens on the cadaver by injecting fluid along its lumen by means of a syringe.

As far as I know this case is unique, and I venture to record the method I devised on account of its being, I believe, a suitable operation in the conservative surgery of an injured vas deferens.

In this case there has occurred absolutely no atrophy of the testis.

J. LYNN THOMAS, C.B., F.R.C.S.

CARDIFF, ENGLAND.

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